REPUBLIC OF MOLDOVA

NATIONAL IMPLEMENTATION PLAN FOR THE STOCKHOLM CONVENTION ON PERSISTENT ORGANIC POLLUTANTS

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National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants

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Ministry of Ecology and Natural Resources
9, Cosmonauþilor str., MD-2005, Chiºinău
Tel: (+ 373 22) 20-45-07
Fax: (+ 373 22) 22-68-58
e-mail: egreta@mediu.moldova.md
Home page: www.moldova.md
www.cim.moldova.md

Co-ordinated by the World Bank/GEF Project "Enabling Activities related to the implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs) in the Republic of Moldova", tel/fax: (+ 373 22) 22-62-54,
e-mail: aisac@moldovapops.md,
Web site: www.moldovapops.md

The project team: *Andrei Isac,* Project Manager;
Ion Barbărasă, Chief Technical Advisor;
Elena Muntean, Assistant

The National Implementation Plan was developed based on the Article 7 of the Stockholm Convention, signed on *May, 23, 2001* and entered into force on *May, 17, 2004.* According to the provisions of the Convention, each Party shall develop and endeavour to implement a plan for the implementation of its obligations under this Convention.

This publication it is composed of the full version of the National Implementation Plan, as of May 2004.

Publishing & Printing Enterprise *ªtiinþa*
Academiei str., 3.
MD 2028, Chiºinău, Moldova
Tel. (+373 22) 73-96-16
Fax (+373 22) 73-96-26
e-mail: prini@stiinta.asm.md

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GOVERNMENT OF THE REPUBLIC OF MOLDOVA

DECISION nr.1155
from 20 October 2004
Chisinau

on the approval of the National Strategy on the reduction and elimination of persistent organic pollutants and the National Implementation Plan for the Stockholm Convention on persistent organic pollutants

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In order to reduce and eliminate the impact of the persistent organic pollutants on the environment and human health, to implement the Stockholm Convention provisions and to create an efficient system of chemical safety, the Government DECIDES:

1. To approve:

The National Strategy on the reduction and elimination of the persistent organic pollutants, annex nr.1;

The National Implementation Plan for the Stockholm Convention on persistent organic pollutants, annex nr.2.

2. The Ministry of Ecology and Natural Resources and the Ministry of Health will collaborate with the international institutions and donor countries for obtaining technical assistance and financial support in order to harmonize the environmental protection and public health policies and for the achievement of the provisions of the mentioned Strategy and Plan.

3. The ministries, the departments, the public administration authorities and the involved institutions will undertake the necessary measures for the achievement of the planned actions and will present annually, according to the established procedure, to the Ministry of Ecology and Natural Resources the information regarding the results of implementation of the nominated Strategy and Plan.

4. The Ministry of Ecology and Natural Resources has been assigned co-ordnating and control functions for carrying out the Strategy and Plan, for information generalization and for annual presentation of the synthesized report to the Government.

Prime-minister
of the Republic of Moldova VASILE TARLEV

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That document was developed due to the contribution and support of all below listed persons:

The National Co-ordination Committee:
Gheorghe Duca, Acad., Prof., President of AS
Constantin Mihailescu, Minister of Ecology and Natural Resources
Liudmila Marduhaeva, National Focal Point
Lucreþia Ciurea, MOF
Nicolae Danilov, MAFI
Petru Groza, MOI
Ilie Timofte, ME
Ion ªalaru, MOH
Ghenadie Primovici, MOTC
Elena ªubina, MOE
Ion Copãceanu, DOC
Elena Pentilie, DOSM
Pavel Vlad, AS
Maria Gonþa, NGO Chimeco
Elena Zubcov, NGO Ecotox

Representatives of institutions, NGOs and national experts:

Sergiu Covaliu	*Violeta Ivanov*
Mihai Iftodi	*Maria Nagornîi*
Tatiana Þugui	*Tatiana Pleºco*
Arcadie Zagorodniuc	*Larisa Gheorghiev*
Nicolae Opopol	*ªtefan Stasiev*
Alecu Reniþã	*Tamara Guvir*
Jana Tafi	*Alexandru Stratulat*
Viorica Gladchi	*Vlad Garaba*
Constantin Mogoreanu	*Victor Strãtilã*
Lidia Romanciuc	*Victor Cotruþã*
Pavel Zamfir	*Anatol Tãrîþã*
Gavril Gîlcã	*Marius Þãranu*
Ghenadie Sirodoev	*Mihail Coca*
Victoria Reºetnic	*Anna Cumanova*
Ion Comendant	*Alexandru Musteaþã*

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FOREWORD

During the last decade the problem of Persistent Organic Pollutants (POPs) was placed on the environmental agenda of the Republic of Moldova as part of toxic substances and waste management programmes. Since 2001, after the signing of the Stockholm Convention, it was defined as a separate field of actions, which became a priority one among the main environmental issues of the country.

At the same time, sound management of persistent organic pollutants was considered an essential precondition for economic growth. The Economic Growth and Poverty Reduction Strategy of Moldova underlines the link between the environment, health and the impact of POPs, proposing special urgent measures in order to solve these problems.

In dealing with POPs, the country must follow a process that includes developing a clear understanding of the situation, setting priorities and establishing realistic objectives for actions. The Preparation of the Moldova National Implementation Plan (NIP) for the Stockholm Convention followed such a process utilizing a participatory approach whereby all interested partners in society (national and local government, economy, science, energy, agriculture, education, NGOs) had an active role in the decision-making and assumed their full share of responsibility for the NIP. Broad involvement was ensured through the free flow of information, participation in workshops and consultative meetings, consideration for the views of individuals and stackeholders groups, affirmation of the partnership principle, and awareness-raising campaigns.

To achieve maximal efficiency continued efforts have to be planned to integrate and update, as needed, NIP activities into relevant national (economic and environmental) and international environmental activities. The NIP will become an efficient tool in solving the POPs problems in the country and will lay the groundwork for an environmentally sound chemicals management system in the Republic of Moldova.

Despite the existing difficult economic situation, the Republic of Moldova is committed to fulfilling its obligation regarding POPs under the Stockholm Convention. This will require increased internal institutional and financial resources and the mobilization of international assistance. The World Bank, which financed preparation of the NIP, through the Global Environment Facility (GEF), is currently assisting the Republic of Moldova in preparing a POPs Stockpile Management Project. Joint efforts such as this will be crucial to the success of the NIP in promoting a safe environment and protecting public health as part of the sustainable development of the country.

Constantin Mihailescu
Minister of Ecology and
Natural Resources

Edward Brown
Country Manager
The World Bank
Country Office, Moldova

ABBREVIATIONS AND ACRONYMS

Basel – The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal

BAT – Best Available Techniques

BEP – Best Available Practices

CCM – Center for Chemicals Management

CIS/NIS – Commonwealth of Independent States/Newly Independent States

CLRTAP (POPs) – Convention On Long-range Transboundary Air Pollution, Protocol on Persistent Organic Pollutants

CPM – Center for Preventive Medicine

DDE – Dichloro-diphenyl-dichloroethilene

DDT – Dichloro-diphenyl-trichloroethan

DES – Department for Emergency Situations

DOC – Department of Customs

EBRD – European Bank for Reconstruction and Development

EIA – Environmental Impact Assessment

ESSD – Environmentally and Socially Sustainable Development

EU – European Union

FDI – Foreign Direct Investment

FSU – Former Soviet Union

GDP – Gross Domestic Product

GEF – Global Environment Facility

GRM – Government of the Republic of Moldova

HCB – Hexachlorbenzene

HIPC – World Bank-IMF Heavily Indebted Poor Countries Initiative

HMS – Hydrometeorological Service

IBRD – International Bank for Reconstruction and Development

IDA – International Development Association

IMF – International Monetary Fund

LRTAP – Convention on Long-range Transboundary Air Pollution

MAC – Maximum Allowable Concentration

MAFI – Ministry of Agriculture and Food Industry

MDL – Moldovan Leu (national currency)

ME – Ministry of Energy

MECTD – Ministry of Ecology, Construction and Territorial Development

MENR – Ministry of Ecology and Natural Resources

MFA – Ministry of Foreign Affairs

MIA – Ministry of Internal Affairs

MOD – Ministry of Defense

MOE – Ministry of Economy

MOH – Ministry of Health

MOI – Ministry of Industry

MOJ – Ministry of Justice

MOTC – Ministry of Transport and Communications

NEAP - National Environmental Action Plan

NEHAP – National Environmental Health Action Plan

NGO – Non-governmental Organization

NIP – National Implementation Plan

NIS – Newly Independent States

OECD – Organization for Economic Co-operation and Development

PCBs – Polychlorinated Byphenils

PCDDs – Polychlorinated Dibenzo-p-Dioxins

PCDFs – Polychlorinated Dibenzofurans

PIU – Project Implementation Unit

POPs – Persistent Organic Pollutants

ppb – parts per billion

ppm – parts per million

REC – Regional Environmental Center

Rotterdam – The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade

SEE – State Ecological Expertise

SEI – State Ecological Inspectorate

TACIS – Technical Assistance for the Commonwealth of Independent States (EU Programme)

TBD – To-be-Determined

UNECE – United Nations Economic Commission for Europe

WHO – World Health Organization

SUMMARY

The National Implementation Plan (NIP) provides a policy framework and describes concrete interventions to reach the national objectives and priorities regarding the management of Persistent Organic Pollutants (POPs), and to meet the obligations taken by the Republic of Moldova under the Stockholm Convention. The NIP seeks to encourage, facilitate and support national and local authorities in their efforts to collect and properly dispose of POPs as well as to remediate or contain sources of POPs pollution. To this end, a wide range of tools is proposed, including regulatory, voluntary, remedial, monitoring, enforcement, and research tools.

The national policy regarding POPs, which is an integral part of national environmental policy, is driven by understanding that a comprehensive chemical safety management system needs to be created in the Republic of Moldova. It recognizes the need to apply a precautionary, prevention and polluter pays approach in addressing POPs, and implement*ing cost-effective measures to prevent environmental* degradation and negative societal, particularly health, impacts. In the NIP, POPs issues are regarded as a separate chemical management issue only to the extent needed to the fulfillment of specific obligations arising from the Stockholm Convention; in all other relations, POPs activities have to be integrated in the overall strategy to protect human health and the environment from the risks resulting from exposure to toxic substances. The national environmental and sectoral policies, strategies and programs should be amended to reflect POPs priority elements, as well as other dangerous and toxic substances management issues.

The NIP is consistent with the national sustainable development strategy and programs aiming at harmonizing economic, environmental and social aspects of development. For example, environ-

▲ Storage conditions. Obsolete pesticides warehouse, Gratiesti, Chisinau mun.

▲ Barrels of obsolete pesticides in the warehouse, Pascani, Hincesti rayon

mentally sound management of POPs pesticides and other prohibited and unused agricultural chemicals is considered helpful for marketing Moldovan organic agriculture products worldwide.

The obligations under the Stockholm Convention are only a subset of broader international obligations of the Republic of Moldova. The links and operational platform between the Stockholm Convention, the Aarhus Convention and its Protocol on POPs, the Basel Convention, the Rotterdam Convention and other relevant multilateral environmental agreements ratified by the Republic of Moldova should be established.

The process of NIP preparation followed the UNEP/World Bank "Guidance for Developing a NIP for the Stockholm Convention". The Ministry of Ecology and Natural Resources[1] (MENR) assumed the main responsibility for developing the NIP, with an active participation of all stakeholders, including governmental bodies, local communities, consumer groups, the business sector, scientific community, NGOs, etc. A prior national inventory of POPs enabled a better setting of priorities and national objectives in the field of POPs management.

Pursuant to the requirements of the Stockholm Convention, the MENR and other stakeholders have identified the following strategic objectives:
Reduction of POPs releases from intentional production and use (*Article 3*).

- Prohibit production and use (except PCBs in equipment) and eliminate import and export of POPs chemicals listed in Annexes A and B by 2005.
- Establish a schedule to phase out the use of PCBs in equipment according to Annex A, Part II (a) of the Convention and totally ban these PCBs by 2025.
- Implement systematic measures for reduction of exposure and risk from use of PCB-containing equipment according to the Annex A, part II, b of the Convention.
- Prohibit recovery for reuse in other equipment of PCB-containing liquids according to the Stockholm Convention requirements (Annex A, part II, d) by amendments of legislation until the 2010 and establish environmentally sound waste management of liquids and equipments contaminated by PCBs not later than 2028.

[1] The MENR is the successor of the Ministry of Ecology, Construction and Territorial Development (MECTD). The reorganization was undertaken in March 2004.

- Identify the PCBs content in other than energy equipment and articles and manage them accordingly by 2025.
- Evaluate national options for specific exemptions according to the Stockholm convention requirements by 2005.
- Establish a mechanism for the assessment of new pesticides and industrial chemicals (in accordance with the POPs criteria) by 2007.
- Implement assessment of pesticides and industrial chemicals in use according to the POPs criteria by 2010.

Reduction or Elimination of Releases from Unintentional Production (Article 5)

- Further investigation of sources and current management options regarding releases of chemicals listed in Annex C in order to prepare relevant Action Plan by 2006.
- Identify BAT and BEP for every particular industry and sources by 2010, and introduce BAT and BEP for new sources since 2010.
- Promote measures to achieve release reduction since 2006.

Reduction or Elimination of Releases from Stockpiles and Wastes (Article 6)

- Finalize the collection of prohibited pesticides at district deposits during 2004-2006.
- Finalize the strategy for identification of stockpiles consisting of or containing chemicals listed in Annexes A and B, and products containing POPs listed in Annexes A, B and C by 2006.
- Manage obsolete pesticides stockpiles and wastes in an environmentally sound manner, following international standards and guidelines, according to the following scheme: (100% of POPs pesticides contained stockpiles and wastes by the year 2005, 25% of other stockpiles containing obsolete pesticides by 2006, 50% – by 2007, 75% – by 2008, and 100% – by 2009).
- Establish a schedule for managing PCB-containing stockpiles and wastes in an environmentally sound manner, starting since the completion of the identification process, but not later than 2007.
- Establish a schedule for managing products containing POPs listed in Annexes A, B and C, starting since the completion of the identification process, but not later than 2009.
- Prohibit recovery, recycling, reclamation, direct reuse and alternative use of POPs listed in Annex A (except PCBs) by legal provision by 2005.
- Prohibit recovery, recycling, reclamation, direct reuse and alternative use of PCBs by legal provision by 2006.

▲ Entrance to the Vulcanesti Pesticides Landfill (2003)

▲ Block of capacitors

- Prohibit recovery, recycling, reclamation, direct reuse and alternative use of POPs listed in Annex C by legal provision by 2006.

Listing of Chemicals in Annexes A, B and C (Article 8)

- Monitor POPs candidates use and impacts and utilize internationally accepted experience and findings.

Research, Development and Monitoring (Article 11)

- Develop environmental and health oriented monitoring strategies and start step by step implementation since 2005, starting with priority areas, zones and concerns.

The NIP covers the period of five years and foresees four categories of actions, as follows:

- Legal, Regulatory and Institutional Activities: Improving the legal and regulatory framework is a prerequisite for effective POPs management in Moldova. This category of actions is targeted at: (1) amending the current legislation, in order to make it consistent with the Stockholm Convention, and incorporating provisions for establishing a broader chemical safety approach in the country; (2) drafting specific regulatory acts and supporting operational guidelines and practical handbooks; (3) establishing an adequate institutional framework for co-ordination of POPs related activities. Secondary legislation (regulations, procedures, standards and guidelines) shall clarify monitoring, reporting, inspection, implementation, and enforcement responsibilities of all parties involved. An integrated environmental permitting should be developed and provisions for BAT and BEP regarding POPs sources (new and existing) addressed. The regulatory requirements should also be transferred into practical and operational guides, as well as introduced to the general public in simple and understandable terms.
- Capacity Building: This category includes actions related to the training of professionals and decision makers; improvement of POPs inventories; increasing the capabilities for hot-spots identification, reporting, monitoring and control, research and development; strengthening the national capacity for chemical risk assessment and risk management by promotion of international cooperation and technical assistance. Coordination, compatibility and integration of monitoring, laboratory and compliance control capabilities shall be enhanced to improve POPs cycle information and data management, thus facilitating more effective and efficient national programming, planning and decision-making. Adequate information management should be promoted through a common

integrated computerized system of tracking regulated POPs, dangerous and toxic substances and other chemicals throughout their life-cycle.

- On-ground Remediation Measures: These include repackaging and centralisation of obsolete pesticides at the district storage facilities, identification of the most appropriate solution for their final elimination, low-cost measures to minimise the impacts of abandoned storage facilities, collecting old DDT stocks from rural households, and remediation measures at the pesticide dump in Ciºmichioi and the stockpiles of out-of-use capacitors in Vulcãneºti and other places. An extensive and POPs specific technical assistance program should be promoted by involving potential international financial sources and technology transfer options.
- Public Awareness, Training and Education: The measures under this category refer to raising public awareness and ensuring proper communication on POPs-related issues, including the incorporation of POPs issues in educational programmes. The Communication Strategy, developed in the framework of the POPs Enabling Activities Project, will be used as the main driving engine to promote POPs awareness among the general public, decision makers and effected groups.

The MENR and the Stockholm Convention national focal point sought suggestions from relevant government agencies and it was unanimously acknowledged that Moldova did not need exemptions as specified in Art. 4. At the same time, national and sector-wide privatization being almost completed, the majority of industrial and agricultural production is concentrated in the private sector. In this regard, MENR shall continue consultations with major private industrial and agricultural producers, manufacturers' and consumer associations, to seek whether some exemptions might be requested by the private sector.

Severe economic and financial constraints limit the country's capability to achieve expected level of POPs release reduction. Therefore, one of the country's first priorities is joint implementation of nationally and internationally supported efforts, which is a strategic pathway for the solving of POPs and other chemicals issues in Moldova. It is particularly important to establish sustainable co-financing and contributing platforms between international, national, regional and local sources, government and private funds. Incentives need to be provided to increase the share of local public and private sector financing. A phased increase in public environmental expenditures in POPs shall be planned parallel to overall economic recovery or, at least, ensure timely release and efficient execution of budgetary allocations for priority POPs issues.

The implementation of the Stockholm Convention will be coordinated in the Republic of Moldova by the National Committee for Environmental Policy, established in July 2002, which brings together senior officials from the key ministries. To support activities of the National Committee in the field of chemical safety, the MENR should consider bringing various related international Conventions' focal points under one umbrella, transforming the existing POPs PIU into a separate legal entity (Center for Chemicals Management - CCM) to coordinate and manage Moldovan international obligations under the Basel, Stockholm, LRTAP and Aarhus Protocols (and potentially Rotterdam Convention,) thus gaining synergies and improving and increasing efficiency, cost-effectiveness, transparency, accountability and cross-fertilization. POPs-related obligations of various ministries and agencies require focusing, fine-tuning of authority and responsibilities, as well as better coordination and proactive cooperation – the MENR shall be assigned leading responsibility and given relevant powers to ensure enforcement. The CCM should serve as an expertise, guidance and coordination unit.

The NIP provides flexibility for implementation mechanisms and operational plans, and implementation agencies should have a sort of maneuvering in order to reach established national goals timely and efficiently, but strictly considering the principles of safe and environmentally sound measures. The NIP will be periodically evaluated by means of established criteria and indicators, analyzed by stakeholders and revised if appropriated.

1. INTRODUCTION

Over the last 40 years awareness has been growing globally about the threats posed to human health and to the environment by the ever-increasing emissions and discharges into the natural environment of various toxic and hazardous substances. Mounting evidence of health and environmental damage has focused the attention of the international community on a category of substances referred to as Persistent Organic Pollutants (POPs.) Some of these are used as pesticides, while others are industrial chemicals. They are also generated unintentionally as byproducts of combustion and industrial processes. POPs possess *toxic characteristics*, *are persistent*, *accumulate in the fatty tissues of most living organisms*, *are prone to long-range transboundary transport and are likely to cause significant adverse human health or environmental effects near to and distant from their sources*. The realization of POPs' health and environmental threats led a number of countries to introduce policies and legislation to manage an increasing number of these chemicals. Due to POPs' persistence and propensity to cross-border movement, states are also seeking multinational co-operation to address the challenge.

The 1995 Global Programme of Action for the Protection of Marine Environment from Land-based Activities and the 1998 POPs Protocol to the UNECE Convention on Long-range Transboundary Air Pollution (CLRTAP) were responses to this serious situation. The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal was one of the first to address management of toxics, complemented later primarily by the Rotterdam Convention on the Prior Informed Consent (PIC) Proce-

▲ Storage place for different types of obsolete pesticides

dure for Certain Hazardous Chemicals and Pesticides in International Trade. In addition, it was acknowledged that there was sufficient scientific evidence for immediate international action regarding 12 POPs. The Convention on Persistent Organic Pollutants (The Stockholm or POPs Convention) was adopted and opened for signature at the Conference of Plenipotentiaries in Stockholm on May 22, 2001. The Convention will become legally binding on May 17, 2004.

The overall objective of the Stockholm Convention is to protect human health and the environment from POPs[2]. It makes specific reference to the precautionary principle as set forth in Principle 15 of the Rio Declaration on Environment and Development. The Stockholm Convention provides subscribing Parties with basic objectives, principles and elements to be used in developing comprehensive programs and control regimes with respect to POPs. It is structured to address POPs that are a) *intentionally produced*, such as pesticides and PCBs, and b) *produced* and *released unintentionally* as the result of human activity, including dioxins, furans, PCBs, and HCB. The nine chemicals currently listed in Annex A of the Convention are subject to a ban on production and use, except where there are generic or specific exemptions. In addition, production and use of DDT, a pesticide still used in many developing countries for malaria and other diseases vector control, is severely restricted, as set forth in Annex B of the Convention. Import and export of the ten intentionally produced POPs is allowed only for the purpose of environmentally sound disposal under restricted conditions.

Special provisions are included in the Stockholm Convention for those Parties, with regulatory assessment schemes to review existing chemicals for POPs characteristics and to take regulatory measures with the aim of preventing the development, production and marketing of new substances with POPs characteristics.

Releases of unintentionally produced by-products listed in Annex C are subject to continuous minimization with, as objective, the ultimate elimination where feasible. The most stringent control provision with regard to by-products is that Parties shall promote and, in accordance with their action plans, require the use of best available techniques (BAT) for new sources within major source categories.

The Convention also foresees identification and safe management of stockpiles containing or consisting of POPs. Waste containing, consisting of or contaminated with POPs should be disposed of in such a way that the POP content is destroyed or irreversibly transformed, so that it does not exhibit POPs characteristics. Where this does not represent the environmentally preferable option or where the POPs content is low, waste shall be otherwise disposed of in an environmentally sound manner. Disposal operations that may lead to recovery or re-use of POPs are explicitly prohibited. With regard to shipment of wastes, relevant international rules, standards and guidelines, such as stipulated in the Basel Convention, are to be taken into account.

The POPs Convention requires the Parties to develop implementation plans to indicate how they will meet their obligations under the Convention. The implementation plans are to be transmitted to the Conference of the Parties within two years of the Convention entering into force. In addition, the Convention sets forth a number of obligations that the Parties shall or are encouraged to undertake, including designating a national focal point, fostering information exchange, providing technical assistance, promoting and facilitating public awareness and participation, consultation and education, stimulating research and monitoring, and reporting "at periodic intervals." The Republic of Moldova signed the Stockholm Convention on May 23, 2001 and ratified it on February 19, 2004.

Moldova has severe public health and environmental problems linked to the intensive use of pesticides in the past. The stockpiles of obsolete (including POPs) pesticides are a continuous threat to the health of thousands of people. The country has accumulated large amounts of PCB oils and PCB-contaminated equipment in the energy sector, which present high risks to the environment and public health. At the same time, Moldova lacks credible evidence about the current releases, the degree of environmental contamination and health impacts due to unintentionally produced POPs and PCBs. The Government of Moldova acknowledges that elimination of POPs will serve the long-term interests of public health, environment, and economic development of the country.

In 2001, the Government of Moldova requested from the Global Environment Facility (GEF) fi-

[2] The 12 chemicals listed in the Convention are: aldrin, chlordane, dieldrin, endrin, heptachlor, mirex, toxaphene, DDT, hexachlorobenzene, PCBs, chlorinated dioxins and chlorinated furans.

▲ General view of the Vulcanesti (Cismichioi) Pesticides Landfill

nancial assistance for strengthening its capacity to fulfill the obligations arising from the POPs Convention, including the development of a planning framework to identify priority activities. This assistance has been provided in the framework of a $410,000 GEF POPs grant - "Enabling activities related to the implementation of the Stockholm Convention on POPs in the Republic of Moldova". The National Implementation Plan (NIP) is one of the main outputs of this project. The goal of the NIP is to provide a framework and management options and measures in order to meet the obligations taken by Moldova by joining the Stockholm Convention and to reach the national objectives and priorities regarding the POPs.

The Ministry of Ecology and Natural Resources[3] (MENR) assumed the main responsibility for developing the NIP as the state authority responsible for compliance and enforcement of national legal requirements and international obligations related to management of toxic and hazardous products and substances. It must be stressed that the NIP was developed as an interagency and cross-sectoral document. The National Implementation Plan was prepared by a multi-disciplinary group of national experts. From the very beginning, the NIP development was approached as a process with active participation of all stakeholders and based on the shared responsibility of the governmental bodies, local communities, consumer groups, the business sector, scientific community, NGOs, etc.

A preliminary national inventory of POPs was undertaken in order to provide quantitative information for initiating development of an Action Plan. Gathered data allowed for setting priorities and determining the national objectives in the field of POPs minimization and elimination, a process in which national stakeholders were largely involved. On the basis of the discussed and agreed priorities and objectives the National Implementation Plan was formulated for different areas of POPs. Small problem-oriented teams were set out, to tackle specific issues related, for example, to persistent organic pesticides or PCBs or POPs monitoring and research. During their activity, members of the teams worked closely with counterparts in the appropriate governmental or non-governmental sectors. Workshops were organized that brought together senior representatives of all of these sectors

[3] The MENR is the successor of the Ministry of Ecology, Construction and Territorial Development (MECTD). The reorganization was undertaken in March 2004.

in order to discuss national strategies and options for eliminating POPs.

The NIP includes both regulatory and non-regulatory measures targeting POPs. It is obvious that POPs are only a small part of the chemicals that need control and monitoring in view of their possible impact on the environment and human health. Therefore, POPs issues are treated in the NIP as an independent chemical management issue only to the extent this is related to the direct fulfillment of specific obligations arising from the Stockholm Convention. In all other relations, POPs activities have to be integrated in the overall strategy to protect human health and the environment from the risks resulting from exposure to toxic substances.

At the same time, the NIP is consistent with the national sustainable development strategy and programs aiming at harmonizing economic, environmental and social aspects of development. The Economic Growth and Poverty Reduction Strategy, currently prepared by the Government, will determine the country development in the medium term. In the context of the NIP, poverty and environment are related through a complex web of relationships. Environmental conditions have major effects on the health, opportunities, and security of poor people. A large part of the Moldovan population is actively involved in or directly depends on agriculture activities, which makes them susceptible to impacts from obsolete pesticides. Contamination of agriculture land and foodstuffs with POPs pesticides residues compromises the future options for developing organic agriculture and undermines the export potential of agriculture products. Therefore, the sound management of POPs is not to be treated as an exclusively environmental issue. One of the major themes of the NIP is that improving environmental conditions by mitigating POPs-related problems can help to stimulate economic growth and reduce poverty. The many links between environmental management and poverty reduction provide the rationale for the systematic mainstreaming of this nexus in the NIP priority activities.

The NIP is structured as follows. Chapter 2 provides a very brief profile of the country, including general social, economic, environmental and environment management information. Chapter 3 introduces the principles of the NIP development. An assessment of POPs-related issues in Moldova is presented in Chapter 4. The political statement and country strategy in the field of POPs and chemical management are presented in Chapter 5, and the actions incorporated in the NIP follow in Chapter 6. Finally, Chapter 7 provides the framework for implementation, evaluation and updating of the NIP. More detailed background information can be found in the NIP Background Paper and technical reports, which are provided on the project's website[4].

[4] www.moldovapops.md.

2. COUNTRY PROFILE

2.1. General Issues

The Republic of Moldova is a small, landlocked and densely populated country located in the South-Eastern part of Europe, bordering Romania and Ukraine. The country has a population of 4.3 million people, of which 0.7 million live in Transnistria, Moldova's most industrialized region. Transnistria is de facto (politically and institutionally) separated from the rest of the country. Out of the total population, 54% are rural inhabitants, most of them involved in agriculture activities. The prevalence of rural population has important social, economic, political and environmental consequences.

The country is relatively low-lying and hilly, with semi-arid steppe plains in the south covering one third of the territory and fluvial terraces in the west and the east. Moldova is endowed with fertile black soils, covering about 70% of the territory. The climate is temperate and continental. Precipitation is low (400-500 mm a year) and droughts are frequent.

Moldova became independent on August 27, 1991, after the collapse of the Soviet Union. Among the Newly Independent States (NIS), Moldova has been hardest of all hit in terms of economic downturn. During the 1990s, the GDP was in continuous decline reaching in 2000 a level of only 37% of its 1990 value. The Moldovan economy has experienced a severe economic downturn with dramatic drops in real output, fiscal revenues and expenditures, and poverty increase during the transition period. The share of the population with an income less than half of the subsistence minimum (207 lei) is about 53.4%. The increase in poverty has been associated with an increase in inequality. The richest 20% of the population earn close to half of the total income, 11 times more than the poorest 20%[5]. Poverty in Moldova is prevalent in the countryside, where most of pesticides pollution and contamination is located. The poorest quintile in Moldova is composed by 35.8% of urban population and 64.2% of rural population. Revenues in rural areas are mostly in-kind (71.5% of the total disposable income), with cash accounting for only 28.5 %.

▲ Nistru river at Rezina

[5] See: Interim Poverty Reduction Strategy Paper, approved by the GRM on April 11, 2002.

▲ Old house. Central Moldova

Despite good economic growth over the last three years, poverty continues to be a serious problem, with per capita income less than US$460, which makes Moldova one of the poorest states in Europe. More than a half of the population has a consumption level below the internationally comparable absolute poverty line of US$2.15 per day, and a majority falls into the category of chronically poor[6]. The population has been severely affected by the erosion of public health and education systems.

Moldova is one of the region's most heavily indebted countries with an external debt stock (excluding energy arrears) of about 83 percent of GDP. A variety of factors impedes development. The country is highly dependent on capital flows from abroad. The economic climate is not attractive to investors. High political risk, a shrinking labor force, and the small size of the Moldovan market work together to keep them at bay.

The abundance of fertile, mineral-rich soils and the temperate climate predisposes the country to agribusiness. Agriculture is a sector of crucial importance for Moldova, employing about 27% of the population and supporting other economic activities, as food and wine production. However, the reform in agriculture has proceeded slowly and contradictorily. Privatization resulted in land fragmentation, which, in turn, led to a significant reduction of agriculture output. The GRM intends to support agriculture development through implementing assistance programs for farmers; creating and providing support to farmer associations; and rural community development. Introduction of organic farming practices may be the key to resolving the problems in agriculture on a sustainable basis and would increase the income of individual farmers. Food processing is the largest Moldovan industrial sector; it is a strategic engine for growth, accounting for 68% of total industrial output, and a similar share of total export.

Moldovan industry is undergoing a deep crisis, largely due to the long-lasting stagnation in investments. During the last decade, the share of industrial output in the GDP has contracted and is presently similar to that of the agriculture sector. Increasing the share of industrial output is one of the major economic goals of the Moldovan Government.

Moldova lacks fossil fuel resources. Hydropower resources are also scanty. The country has to rely heavily on imports of energy resources (98% of the total energy consume). Decreasing country's de-

[6] Moldova: Public Economic Management Review, Report No. 25423-MD, Poverty Reduction and Economic Management Unit, Europe and Central Asia Region, The World Bank, Washington, DC, February 20, 2003, p. 4

pendence upon energy resources from abroad is one of the Government objectives.

Moldova is a "gateway" between the former Soviet Union countries and the West: trade-wise, language-wise and culturally. The country will become increasingly important as a future border between the EU and Eastern Europe, once Romania joins the EU. Road and rail transport are the two most important modes of transport.

2.2. Environmental Overview

Current environmental problems in the country are largely the result of past ineffective and inefficient management, as well as declining environmental expenditures and investment. The severe downturn of Moldovan economy, accompanied with significant price rise in the last ten years, has both positive and negative impacts on the environment. The former include a dramatic reduction in use of agrochemicals and pollution generated in industry and energy sectors. The latter include deteriorating capital assets, declining or no investments at all in waste minimization, abatement and clean technologies, inadequate institutional capacity, environmental management, monitoring, control and enforcement.

With the decline of industrial activity and energy use during recent years, air emissions of sulphur and nitrogen dioxide, carbon monoxide and particulates from stationary sources have decreased[7]. At the same time, the air quality in the main cities (Chisinau, Balti, Tiraspol) did not improve, mainly due to the increased number of (older) vehicles during the last years. The water quality of the main rivers (Nistru and Prut) is satisfactory. The quality of groundwater is a growing concern, and supply of safe drinking water to the population is one of the major national objectives.

About 30% of lands under agricultural cultivation suffer from some form of erosion, the estimated annual loss of agricultural production being US$ 45-55 million. Soil erosion and degradation is progressing at a high rate and totaly eroded land has increased by 45% over the last 20 years. Waste management is rapidly becoming a major concern in Moldova. Domestic waste is deposited in numerous landfills, the majority of which are not properly authorized and do not meet environmental and sanitary requirements. There are no organized disposal sites for hazardous and industrial waste. Most toxic industrial waste is stored at industrial sites while awaiting a solution.

Natural ecosystems have been conserved on less than 20% of Moldova's territory; they are fragmented and highly degraded. Many protected

▲ Landscape of the South of Moldova

[7] Republic of Moldova State of the Environment Report 2002. MECTD & National Institute of Ecology, Chisinau, 2003, 116 p.

plant and animal species are under stress. Protected areas occupy 1.96% of the territory, placing Moldova far behind most other European countries.

After gaining independence, Moldova experienced a deterioration of the health status of its population. The key factors of this trend are collapsing health services and the socioeconomic stress brought about by difficult economic and social change for large segments of population during continuous transition. The current life expectancy at birth (67.4 years in 2000) places Moldova behind most other European nations. The country continues to lag far behind the health status outcomes achieved in other European countries[8]. The burden of chronic morbidity, caused by environmental pollution, affects the quality of life and brings significant social and economic losses. One of the country's strategic objectives is to preserve and improve the quality of the environment as a factor for ensuring the public health.

2.3. Institutional Framework for Environmental Management

Over the past decade Moldova has worked towards improving and shaping its own environmental institutional framework. To-date, together with numerous policies and plans, 41 codes and laws, and about 60 regulations have been adopted. A combination of command-and-control and market-based economic instruments is being used in the country to ensure their implementation and enforce compliance.

The most important policy and strategic documents related to the chemicals issues are: the National Environmental Action Plan (1995), the National Program for Production and Domestic Wastes Management (2000), the Concept of Environmental Policy of the Republic of Moldova (2001), the National Environmental Health Action Plan (2001), the Mid-term Strategy for Socio-Economic Development of the Republic of Moldova to 2005 (2001), the National Program of Environmental Safety (2003) and the Concept of National Water Policy (2003).

The administrative system for environmental management and protection includes at the highest level: (i) the *President,* who is responsible for the state of the environment in the country in front of the global community; (ii) the *Parliament*, responsible for approving general environmental policy principles and adopting laws; and (iii) the *Government*, responsible for the implementation of national environmental policy. The Parliament has a *Commission on Ecology and Natural Resources,* and the GRM has a *Department of Agriculture and Environment* as well as a number of *inter-ministerial ad hoc and standing commissions* created to address specific environmental problems.

The *Ministry of Ecology and Natural Resources (MENR)* is the central national duly environmental authority and was designated the Stockholm Convention competent authority. The main governmental bodies involved in chemicals management issues are: *Ministry of Health (MOH), Ministry of Agriculture and Food Industry (MAFI), Ministry of Industry (MOI), Ministry of Energy (ME), Ministry of Transport and Communications (MOTC), Ministry of Economy (MOE), Ministry of Internal Affairs (MIA), Ministry of Defense (MD), Department of Customs (DOC), Department of Standardization and Metrology* and *Department for Emergency Situations (DES)*. The *local authorities* have responsibilities for environmental protection and management in the limits of their territory, ensuring compliance with applicable legislation and standards. The legislation stipulated a range of obligations for *economic entities* (e.g. to operate on the basis of environmental permits, prevent pollution, manage toxic substances in environmentally safe way, etc).

Since 1991, Moldova began to actively participate in international, regional and bilateral environmental cooperation, signing 17 and ratifying 16 international conventions, including the Basel Convention on Transboundary Movements of Hazardous Wastes and their Disposal; the Geneva Convention on Long-range Transboundary Air Pollution; and the Aarhus Protocol to CLRTAP on Persistent Organic Pollutants. Moldova signed the Stockholm Convention on Persistent Organic Pollutants on May 21, 2001, and ratified it on February 19, 2004, thus demonstrating its continuous commitment to sustainable development and international cooperation in this field. MENR is the national Competent Authority for most of international environmental conventions and hosts all focal points for POPs (chemicals) related agreements.

[8] Moldova Health Policy Note: The Health Sector in Transition. Report No. 26676-MD, Human Development Sector Unit, Europe and Central Asia Region, The World Bank, Washington, DC, November 2003, p.5.

3. NIP PRINCIPLES AND DEVELOPMENT

The philosophy that guided NIP preparation was based on the understanding that the control and elimination of POPs has to be integrated into the broader context of *sound chemicals management*. The most efficient improvement in POPs could be achieved in close connection with the fulfillment of other national needs and international obligations in this field.

POPs are only a small part of the chemicals that need control and monitoring in view of their possible impact on the environment and human health. Therefore, POPs issues are treated in the NIP as an independent chemical management issue only to the extent this is related to the direct fulfillment of specific obligations arising from the Stockholm Convention. In all other relations, POPs activities have to be integrated in the overall strategy to protect human health and the environment from the effects of toxic substances. This means the *establishment of environmentally sound and integrated management of chemicals*, the *institutionalization of precautionary principle* and *integrated pollution and prevention control* in particular sectors. POPs monitoring has to be integrated in the national environmental monitoring system; reporting on POPs has to become part of the general environmental reporting procedure; public information, awareness and education has to encompass, besides POPs, other chemicals.

It follows from the above that POPs NIP can serve as a triggering policy instrument for developing national programs for sound chemicals management. The general principles underlying the NIP preparation are:

- *Integration in the national development and environmental policy*. The NIP is not a stand-alone document. It was developed as a part of the national environmental policy (NIP POPs actions are combined with other environmental actions) and it is consistent with the national sustainable development strategy. The integration of POPs activities in the overall Moldova environmental policy is one of the *conditions sine qua non* to achieve needed efficiency and to contribute to the improving of the environmental situation in general.
- *Integration of chemical management issues in other sectoral policies*. POPs management is not to be treated as an exclusively environmental issue. The NIP is a national document, adopted by the Government, where the obligations of all stakeholders are clearly defined. One of the major themes of the NIP is that improving environmental conditions by mitigating POPs-related problems can help to stimulate economic growth and reduce poverty. The problem of POPs has to be directly related to the economic activities also as a new business opportunity. Sound management of pesticides can help the agricultural sector[9] to promote Moldova's organic agriculture products worldwide. In this sense, introduction of POPs issues in national agriculture policy could bring direct benefits to this sector. Likewise, the energy sector can benefit from PCBs elimination by reducing occupational health impacts, introducing PCB-free and modern energy saving equipment and optimization of infrastructure.
- *Partnership and shared responsibility*. Setting up realistic objectives and effectively reaching them is possible only within a partnership of all beneficiaries (e.g., consumers, the general public) and stakeholders – the business sector, national and local authorities, local communities, NGOs, and the international community. There is a wide range of interests in chemical management and a broad base of involvement and support is required. Each part should assume its share of responsibility. Involvement of different

[9] Agriculture is the most important economic sector in Moldova and the biggest employer. Introduction of organic farming practices may be the key to resolving the problems in agriculture on a sustainable basis and would increase the income of individual farmers. Convincing the international community that POPs and other chemicals are under control would increase the export opportunities for Moldovan organic agriculture products.

stakeholders in the project preparation was also needed to estimate the national technical capabilities for solving POPs problems[10]. Agriculture and energy sectors are the most important stakeholders, and have to be directly involved in solving most of existing problems with obsolete pesticides and PCBs.

- *Coordination with relevant national policy documents and strategies* (e.g. Economic Growth and Poverty Reduction Strategy, National Environmental Action Plan, National Program for Production and Domestic Wastes Management, Concept of Environmental Policy of the Republic of Moldova, National Environmental Health Action Plan, National Program of Environmental Safety, Concept of National Water Policy, Concept of Ecological Agriculture).
- *Coordination with and building on international experience* - relation to other Conventions (Rotterdam, Basel) and relevant international documents. Regional co-operation frameworks (e.g. Transnational Monitoring Network under the International Commission for the Protection of the Danube River) will be used to resolve the POPs issues in Moldova.
- *Emphasize pollution prevention and low-cost solutions*. Remediation of POPs impacts is very costly. Prevention of their releases into the environment through adequate management systems is likely to bring benefits through saving efforts and money. In preventing future and remediating existing damages Moldova will seek to develop affordable low-cost solutions.
- *Right to know and prior informed consent principles*. These establish the basis for ensuring that mechanisms exist for end-users, the public and particularly all potentially impacted individuals have access to information about chemicals and the impacts they may have, and that use is undertaken in that knowledge.
- *Use measurable indicators and assess performance*. The NIP has to be subject to revisions and updates on regular basis. This will be obviously linked to the performance evaluation process. The NIP will include a set of verifiable indicators, designated for this purpose.

The elaboration of the NIP followed the stepwise approach as described in the UNEP/World Bank "Guidance for Developing a NIP for the Stockholm Convention" dated October 2003. A preliminary inventory of POPs in Moldova was undertaken in order to provide quantitative information for initiating development of an Action Plan. The inventory provided a better understanding of the situation, which allowed the setting of priorities and the determining of the national objectives in the field of POPs minimization and elimination, a process in which national stakeholders were largely involved. On the basis of the discussed and agreed priorities and objectives, the NIP was formulated for different areas of POPs. Small problem-oriented teams were set out, to tackle specific issues related, for example, to persistent organic pesticides or PCBs or POPs monitoring and research. During their activity, members of the teams worked closely with counterparts in the appropriate governmental or non-governmental sectors and businesses. Workshops were organized that brought together senior representatives of all of these sectors in order to discuss national strategies and options for eliminating POPs.

[10] Significant resources will be necessary to solve the problems of, e.g., obsolete stockpiles or PCBs. To find low-cost solutions a close cooperation with the national business community and research institutions will be needed.

4. ASSESSMENT OF THE POPs ISSUES IN THE COUNTRY

4.1. Existing POPs-related Legal and Regulatory Framework

Over 25 legal and regulatory acts deal in general terms with the full life-cycle of managing toxic and hazardous substances and wastes, which, though not naming specifically, cover POPs regulated by the Stockholm Convention.

The *Law on Environmental Protection*, adopted on June 16, 1993, established basic principles of environmental protection, including the priority of environmental goals, mandatory environmental compliance, environmental liability, prohibition of implementation of any programs and projects without a positive conclusion of the state ecological expertise and concurrence by the population in the area of impacts, payments for use of natural resources and non-compliance, and use of collected funds for environmental mitigation and rehabilitation.

The *Law on Sanitary-Epidemiological Well-being of Population*, adopted on June 16, 1993, seeks to ensure favorable environmental conditions to support healthy life for citizens, including a variety of chemical safety measures.

The *Law on Ecological Expertise and Environmental Impact Assessment*, adopted on July 26, 1996, seeks to prevent or minimize potential direct, indirect or cumulative impacts of various activities on the environment and to ensure environmental and social sustainability of planning, design and decision-making processes. The state ecological expertise and EIA are mandatory obligations to some chemical related issues.

The *Law on Wastes from Industrial Production and Consumption*, adopted on October 9, 1997, aims at fostering efficient management of wastes in order to reduce their amount, increase recycling and reuse, and prevent environmental pollution and degradation.

The *Law on Regime for Hazardous Products and Substances*, adopted on July 3, 1997, establishes the legal basis for activities related to production, storage, transportation and use of hazardous and toxic products and substances, as well as their import and export, in order to avoid, reduce or prevent their negative impacts on population and environment

The *Law on Protection of Atmospheric Air*, adopted on December 17, 1997, aims at preserving the purity of the air, improving its quality, preventing and reducing negative physical, chemical, biological, radioactive and other impacts, which may cause adverse consequences to the environment and population.

The *Law on Plant Protection* stipulates that all plant protection chemical and biological substances and means shall be certified, tested and registered. Import and use of untested, uncertified and unregistered chemical and other means of plant protection is prohibited.

Certain elements of toxic and hazardous substances and wastes management are regulated by a number of other national laws, as follows: the *Law on the Safety of Dangerous Industrial Facilities*, adopted on February 11, 2000; the *Law on the Control of Strategic Goods Export, Re-Export, Import and Transit*, adopted on July 26, 2000; the *Law on Licensing of Certain Types of Activities*, adopted on July 30, 2001; the *Law on Civil Protection*, adopted on November 9, 2001; the *Law on Consumers Protection*, adopted on March 13, 2003; the *Law on Certification*, adopted on October 28, 1999.

Current Moldovan legislation includes general prohibitions and restrictions on production, use, storage, marketing and disposal of a broad variety of toxic, hazardous, flammable and volatile substances and waste, including POPs listed in the Convention. The main deficiency in the present legal framework is that legislation does not specifically mention POPs and only covers use of substances as plant protection products, not, e.g., biocidal or industrial uses, and it does not regulate unintentional and by-product POPs. As the Convention has both mandatory and aspiration stipulations, and is very broad in scope, in the sense that the control measures cover the whole cycle of POPs, from production to disposal, Moldovan legislation does not yet fully cover all these measures.

Numerous Moldovan laws require that individuals and judicial entities develop, introduce and use advanced environmentally clean technologies that: provide for energy and resources conservation and savings; ensure low- and no-wastes production; prevent emissions and discharges, and reduce impacts on the environment and public health; implement highly efficient and effective process. Though the scope and application of these requirements are similar in their spirit to the BAT described in Annex C to the Convention, Moldovan legislation does not mention BAT or BEP by name and is less specific.

The analysis of existing POPs-related legal and regulatory framework identified the following problems:

- Moldovan legislation does not specifically mention POPs and only covers the use of substances as plant protection products, not, e.g., biocidal or industrial uses; it does not regulate unintentional and by-product POPs and does not mention BAT or BEP.

▲ Barrels with liquid obsolete pesticides, Comrat

- Current legislation does not define public and private sector management responsibilities for POPs during their life-cycle, from production to disposal, as well as contaminated sites.
- There is no framework for prohibition of production and use of specific POPs chemicals to be added to the Convention in the future.
- Not all of the 12 POPs regulated by the Stockholm Convention have environmental standards.

4.2. Current POPs Management, Monitoring and Control

In relation to POPs, MENR is responsible for state legal monitoring, control and compliance enforcement, particularly for production, storage, transportation, use, neutralization, and burial of toxic and hazardous products and substances and their wastes[11]. MENR has to concur to all Statutes, Lists and Registers on toxic and hazardous products and substances prepared and maintained by other ministries and agencies, as well as to sitting of specialized testing grounds for neutralization and burial of hazardous and toxic products, substances and their wastes.

The MOH is responsible for establishing and maintaining the *National Register of Potentially Toxic Chemical Substances* and for listing new substances when necessary. It also amends the *Statute on Procedures for the Use and Elimination of Hazardous Products and Substances and their Wastes*; issues conclusion regarding the *Statute on Procedures for Transporting, Storing and Use of Phyto-Sanitary Means and Fertilizers* and the *List of Chemical and Biological Means of Plants Protection and their Growth Stimulation*.

MAFI includes the *State Service for Plants Protection* and the *State Centre for Phyto-Sanitary Means and Fertilizers Certification*, which has a designated certified laboratory. The *State Register of Phyto-Sanitary Means and Fertilizers*, approved by the interdepartmental Council for *phyto-sanitary means and fertilizers approval*, is elaborated, maintained and updated through a joint effort of MAFI, MOH and MENR.

DOC administers export and imports by ensuring compliance with restrictions established by MENR, MAFI, MOH, which furnish the department with lists of prohibited pesticides and chemicals in accordance with national legislation and international obligations. DOC enforces these restric-

[11] These functions are delegated to the State Ecological Inspectorate, which is a subdivision of MECTD.

▲ General view of a block of capacitors, Orhei

tions at the border, with MAFI and MENR helping customs officers with specific technical issues.

MOE is concerned about several aspects of environmental and energy saving issues, but the problem of PCBs is not specifically on their agenda. Increased pressure from the unresolved problem of PCB oils and power equipment (particularly old capacitors) has driven the energy sector to seek solutions.

There is no established monitoring system on POPs in the country, although the MENR and the MOH have monitoring programs comprising analyses of organochlorinated pesticides, including DDT, in ground and surface waters, soils, drinking water and foodstuffs. There is no information exchange among institutions carrying out analyses of POPs and no unified database.

It is recognized that existing national institutional, organizational, technical, human and financial capabilities are very limited and inadequate for ensuring full implementation of a sound management of chemicals, including those regulated under the Stockholm and other related Conventions and Protocols, without foreign technical and financial assistance,

The analysis of current POPs management, monitoring and control identified the following problems related to Convention requirements:

- Inadequate coordination and communication between environmental and sectoral agencies on POPs–related matters, and their limited capabilities to incorporate environmental dimensions into national and sectoral economic development agenda
- Existing laws and plans suffer from being poorly implemented and enforced, as a result of inadequate funding and inadequate administrative and judicial support.
- Ineffective communication with civil society and lack of meaningful public empowerment
- Disconnection between assumed responsibilities under POPs-related tasks and obligations and financial resources available to meet those commitments to an acceptable degree
- Inadequate laboratory facilities and coordination between the monitoring, analytical and control systems, managed by various ministries and agencies
- Inadequate data and information management systems to handle diverse and multiple purpose databanks; lack of interconnection between sectoral information systems relating to POPs management, thus leading to poor information for decision-making.

▲ New private pesticides and fertilizers warehouse

4.3. Assessment of POPs Pesticides Issues

The Republic of Moldova has never had and does not currently have pesticide producing enterprises or factories; all agrochemicals for plant protection permitted for use in the country have been and are imported from abroad. None of the POPs pesticides is presently included in the register of permitted substances for use in agriculture, forestry and households.

The import/export of pesticides is a licensed activity in Moldova. It is regulated by a number of acts developed by MENR, MAFI, and MOH, and enforced by DOC. POPs pesticides have reportedly not been subject to import/export during the last decade. Nor do any data exist about possible illegal entries of POPs pesticides, but this is not expected to be a very large problem, due to lack of specific demand from the farmers.

In the 1950-1990s an estimated total amount of 560,000 tons of pesticides were used in Moldova, including 22,000 tons of persistent organochlorinated compounds (OCPs). Pesticides use registered a peak in 1975-1985, but reduced dramatically over the last 10-12 years (from 38,300 tons in 1984 to some 2,800 tons in 2000, as active ingredient). The share of persistent OCPs also decreased, in favor of other pesticide groups. (Figure 1 and 2)

The absence in the past of controls on pesticides manufacture, imports, transportation, storage, and use have resulted in the stockpiling of now banned and useless pesticides which constitute an acute environmental problem/hazard. In order to find a solution for the ever-increasing amount of obsolete pesticides accumulated in the country, a pesticide dump was built in 1978 on the territory adjacent to Ciºmichioi village, in the South of Moldova. Over a period of ten years (1978-1988) 3,940 tons of pesticides were buried there, including 654.1 tons of DDT[12].

By the early 1990s, over 1,000 warehouses for pesticide storage have been built in kolkhozes. During 1991-2003 about 60% of these were destroyed or dismantled, with only 20% of the remaining ones maintaining a satisfactory condition. Significant amounts of obsolete pesticides are stored in the open. The deteriorated packaging enhances the risk of harmful effect on people's health and environment, some warehouses being situated close to residential areas.

[12] By now, this is the only option for old pesticides disposal, which has been applied in Moldova at national scale.

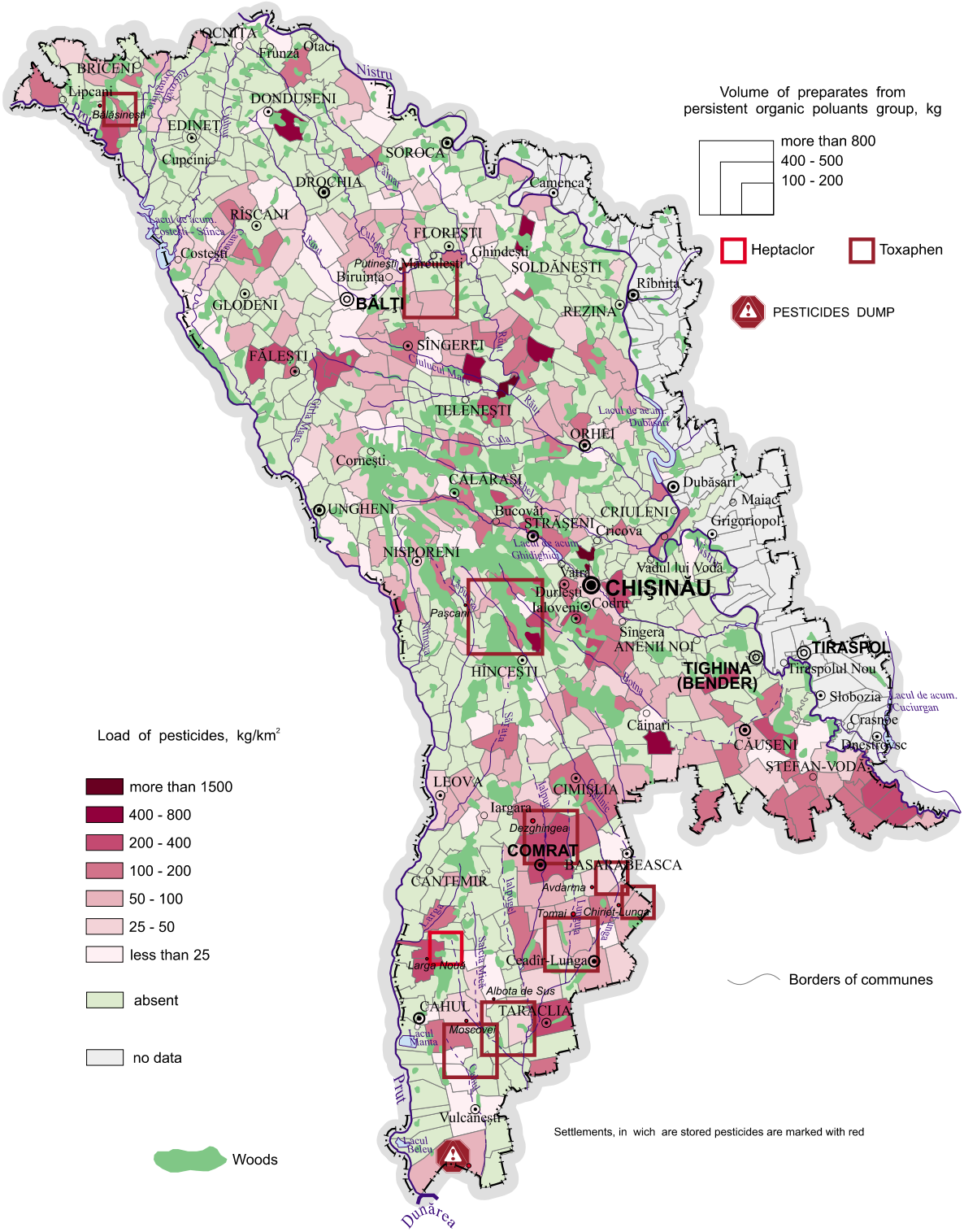


Figure 1. DISTRIBUTION OF PESTICIDES (by communes)

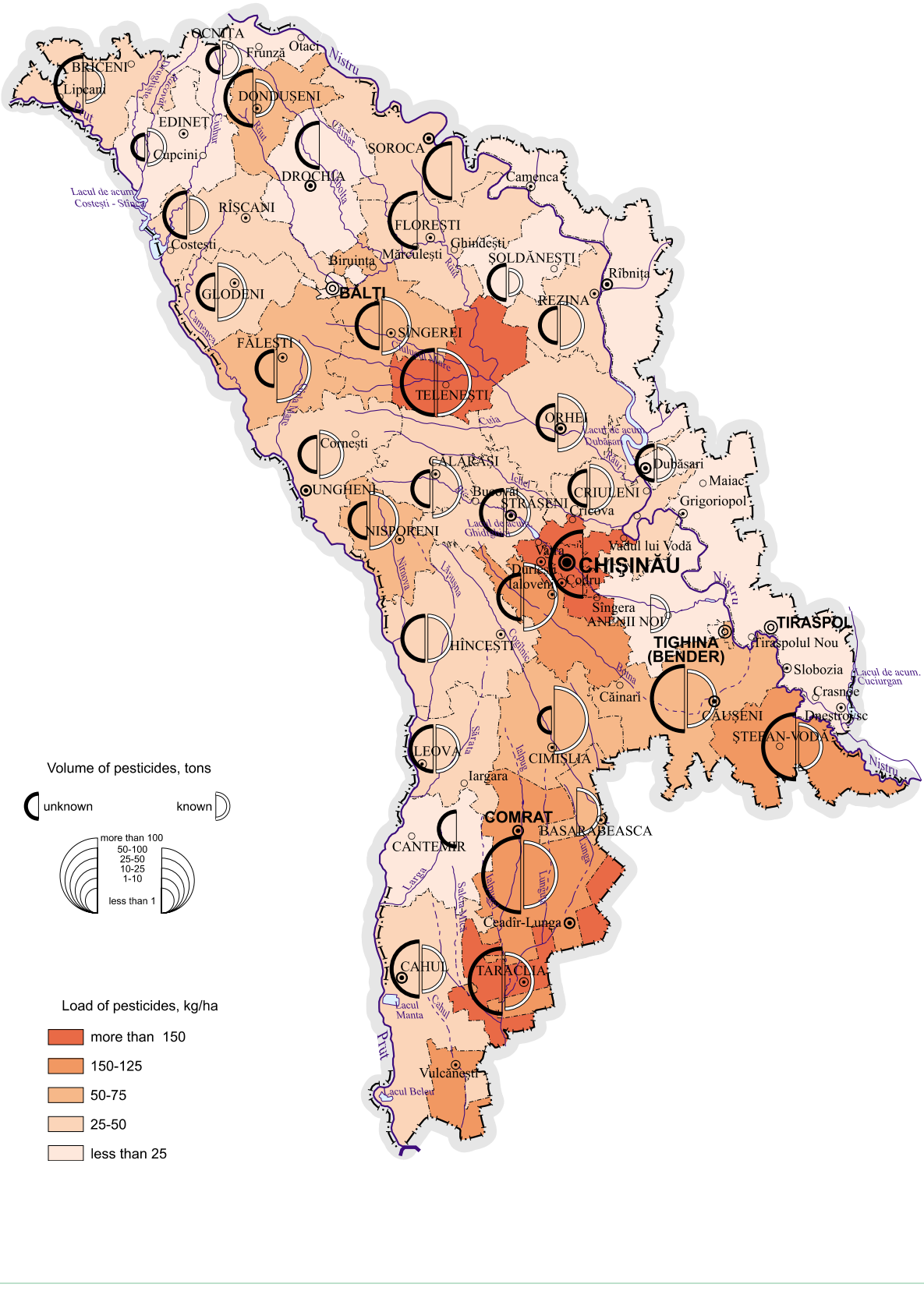


Figure 2. PESTICIDES DISTRIBUTION (on the administrative-territorial units)

▲ Pesticides warehouse in Olanesti, Stefan-Voda

Storing POPs pesticides in inappropriate conditions led to the contamination of adjacent lands. A survey made by the State Ecological Inspectorate in 2002 in the Nistru River basin revealed a significant level of soil contamination with organochlorinated pesticides, including DDT and HCH, around most checked facilities. The concentrations of OCPs in soil regularly and significantly exceeded the MAC even at 200 m from the facilities. In several cases the contamination of surface waters nearby occurred.

Since 1997, three Government decrees have been taken aiming at the collection and centralized storage of obsolete pesticides, while seeking solutions for their final elimination. These decisions have never been implemented. In November 2003, the MOD and DES started repackaging and transportation of obsolete pesticides in a few districts. At the same time, it has to be stressed that no technical solution for final elimination/disposal of obsolete pesticides has been selected so far on the basis of an economical, financial, technical and environmental analysis.

Currently, the total amount of obsolete pesticides in Moldova is approximately 5,650 tons, including about 3,940 tons buried at the pesticide dump in Cismichioi and 1,712 tons stored in 344 poorly equipped or unfitted facilities, which lack

▲ Pesticides Dump. Interior vew

▲ Lapusna pesticides warehouse. General view

proper monitoring and security. Only 777 tons out of the latter amount are identified preparations, and among them POPs pesticides are represented by 80 kg of heptachlor and 1,600 kg of toxaphene. However, no information exists on what amount of POP pesticides may be among the 935 tons of unidentified obsolete pesticides stored in facilities[13]. (Figures 1 and 2)

The amount of obsolete pesticides stored in the warehouses showed a steady decrease over the years. Since 1995, the total amount of recorded pesticides decreased by approximately 600 tons. It would be very difficult to say whether these changes exist only on paper or they are real. It would not be totally unreasonable, however, to assume that some amounts of stored pesticides are

▲ Barrels with Toxaphene, Pascani, Hicesti rayon

▲ A barrel with Heptachlor.
Gura Galbenei, Cimislia rayon

[13] Tentative expert estimates suggest that Stockholm POPs may represent less than 20% of existing stock of obsolete pesticides.

▲ Residues of obsolete pesticides in the open air

subject to illegal disposal, they are stolen, washed out with the runoff or infiltrate into the groundwater, conducting to soil and water contamination.

No comprehensive assessment of the risks associated with POPs stockpiles, contaminated sites and wastes has been made in Moldova so far. In many cases, the exact location and the environmental state of contaminated sites has not been determined. On the other hand, no guidelines were developed providing criteria and procedures for such inventories and for assessing the risks posed by such places, and no decontamination measures have been elaborated at the national level.

During 1976-1990, soil samples showed pesticide contamination levels exceeding the maximum allowable concentration (MAC) from five times in the Southern zone to 50 times in the Central zone. A research by the Institute for Experimental Meteorology of the State Committee for Meteorology of the former Soviet Union showed that in 1979-1985 about 60% of soil samples were polluted with DDT exceeding the MAC, in spite of the fact that DDT was prohibited in 1970.

Since 1989, due to reduction in pesticide application, investigations showed an anticipated decrease of pesticides-related pressure both in annual and perennial crops. During 1990-1995, the regional Centers of Preventive Medicine of the MOH have analyzed the contents of 28 pesticides' residuals in 10 agricultural crops and foodstuffs. Pesticide residuals were found in 56.4% of tomato samples and in 40 % of grape samples, but they never exceeded the MAC. This downward trend has continued in the last years. The percentage of samples investigated during 1995-2002 showing traces of DDT and HCH has decreased every year and only episodically exceeded the MAC. Traces of heptachlor showed up only once. From the foodstuffs, animal products were found to accumulate most: in 2002, DDT residuals were found in 4.5% of samples and HCH in 1.8% of samples. The contamination level of crops was insignificant.

The review of the findings of POPs pesticides assessment against the provisions of the Stockholm Convention revealed the following problems:

- Large amounts of obsolete (including POPs) pesticides are stored in poorly equipped or unfitted storage facilities lacking proper monitoring and security.
- There is no clear ownership and accountability for the obsolete pesticides issue, related to stockpile and contaminated sites management.
- There is evidence of some amounts of POPs pesticides (especially DDT) stored in private households and used by farmers in an uncontrolled way.
- POPs pesticides are still identifiable in the environment (including soil, surface and ground water and foodstuffs), despite the ban on their use imposed long time ago.
- Large areas around former and existing storage facilities are contaminated with POPs pesticides.
- Tracking, reporting and enforcement systems associated with imports and exports of POPs pesticides have to be improved.
- The Government is aware of and committed to solve the problem of obsolete pesticides but lacks capacity for doing it.
- No regulations, standards and/or guidelines were developed covering contaminated sites assessment procedures, remediation criteria, future site use restrictions and site monitoring.

4.4. Assessment of PCBs Issues

PCBs[14] have never been produced in the Republic of Moldova, all of them being imported. Apparently, no control of the quality of dielectric oils exists at national borders related to the concentrations of PCBs. Their utilization in some sectors has been discontinued or prohibited in the 1980s. However, PCBs continue to be used in power installations and other types of equipment. The major sources of environmental pollution with polychlorinated biphenyls in Moldova are the emissions from the energy sector and industry. The main pathways of environmental pollution are the PCB oil spills and leaks from electric equipment, heat exchangers and hydraulic systems, evaporation from different technical installations, and discharges of industrial liquid waste.

It is estimated that most of PCBs in Moldova are concentrated in the electricity sector. This sector has to be primarily targeted to solve the problem of PCBs in Moldova. The preliminary inventory identified that about 30,000 tons of dielectric oils are used in electrical power installations, including approximately 23,300 tons in high voltage transformers, 5,400 tons in circuit breakers and 400 tons in capacitors. (Figure 3) From the total amount, 95-97 % is in the equipment that belongs to power supply entities (producers, transporters, and distributors) and 3-5% in the consumers' electrical installations. The losses of dielectric oils in the energy sector are estimated at 9-10 tons per year.

The power entities keep no records about the type of oil currently or previously filled in equipment. Thus, no direct evidence exists at this moment on whether the dielectric oil is or is not PCB-contaminated. A few selected analyses executed by *Fichtner* (Germany) in 1999, in transformers from the transport division of the power system, and by *Union Fenosa* (Spain) in 2003, in 30 transformers from power distribution companies, did not provide proof of any PCB presence (however, this is not considered to be a representative sample and does not allow any generalization).

In contrast to transformer oil, the capacitors used in Moldova probably contain PCB, and most likely this would be trichlorobyphenil. The total number of capacitor batteries located at 20 electrical substations throughout the country is almost 20,000, containing a total amount of 365 tons of trichlorobyphenil. Most of the capacitors are concentrated at the Vulcanesti substation in the south of Moldova. Over 12,000 batteries are kept at the substation including many out-of-use capacitors, 56 kg each, containing 19 kg of PCB oil. Thus, a total amount of 230 tons of trichlorobyphenil and 670 tons of PCB-contaminated equipment is stored there.

The capacitors represent a significant hazard to the environment. Most of them have been in operation for more than 30 years. There is no check for oil spillages from the capacitors. Old batteries are stored in open metal containers, some of them are leaking. They represent a real threat for the health of people living in the vicinity of the substation. Complaints from the local population about nuisance (unpleasant odours, eyes irritation) are not unusual.

At present, there are no possibilities for disposal of old capacitors in the country. After the break-up of the USSR the former procedures for disposal of capacitor oils have been abandoned. Apparently, no legal requirements exist for disposing of the equipment contaminated with PCBs.

Regulations (dating from the Soviet period) concerning the handling of dielectric oils are in place. However, even the personnel in the energy sector is poorly informed (and only in relation to capacitors) about the PCB risks. The electric installations are not labeled accordingly.

The degree of uncertainty related to the PCB problem in Moldova is quite high. No monitoring of PCBs and PCB-containing materials is being done in the country. There is no reliable systematized information on leakage accidents and consequences of PCBs pollution of the environment, or other negative impacts of PCBs. Almost nothing is known about the amount of PCBs in the electric equipment being used and the out-of-use installations; the PCB releases to the environment during last decades; their content in the environment; PCB-contaminated sites; or the exposure of the population to PCBs and their environmental risks.

Lack of information concerning non-energy sector PCB applications does not allow any perti-

[14] The polychlorinated biphenyls (PCBs) are a group of hydrocarbons that have largely been used along the 20th century in the energy sector and industry. PCBs have been manufactured primarily for use as dielectric fluids in power installations (especially transformers and capacitors). They also had a number of industrial applications, in hydraulic equipment, as plasticizers, lubricants, etc. Starting with the 1960s, scientific evidence accumulated showing that these substances are quasi indestructible, highly bioaccumulative and toxic. Consequently, in the 1970-1980s production and marketing of PCBs became forbidden in all industrialized countries.

▲ Power transformer in operation “Moldelectrica”, Orhei

nent conclusions in this field. The preliminary inventory provided no information on the matter. The sectors/industries where a certain amount of PCBs could be presently used in Moldova are as follows: hydraulic fluids; lubricating oils; adhesives; paints; surface treatment for textiles; plasticizers; sealants; fluorescent lamp ballasts and other consumer goods.

The review of the findings of PCBs assessment against the provisions of the Stockholm Convention revealed the following problems:

▲ Capacitor batteries in blocks

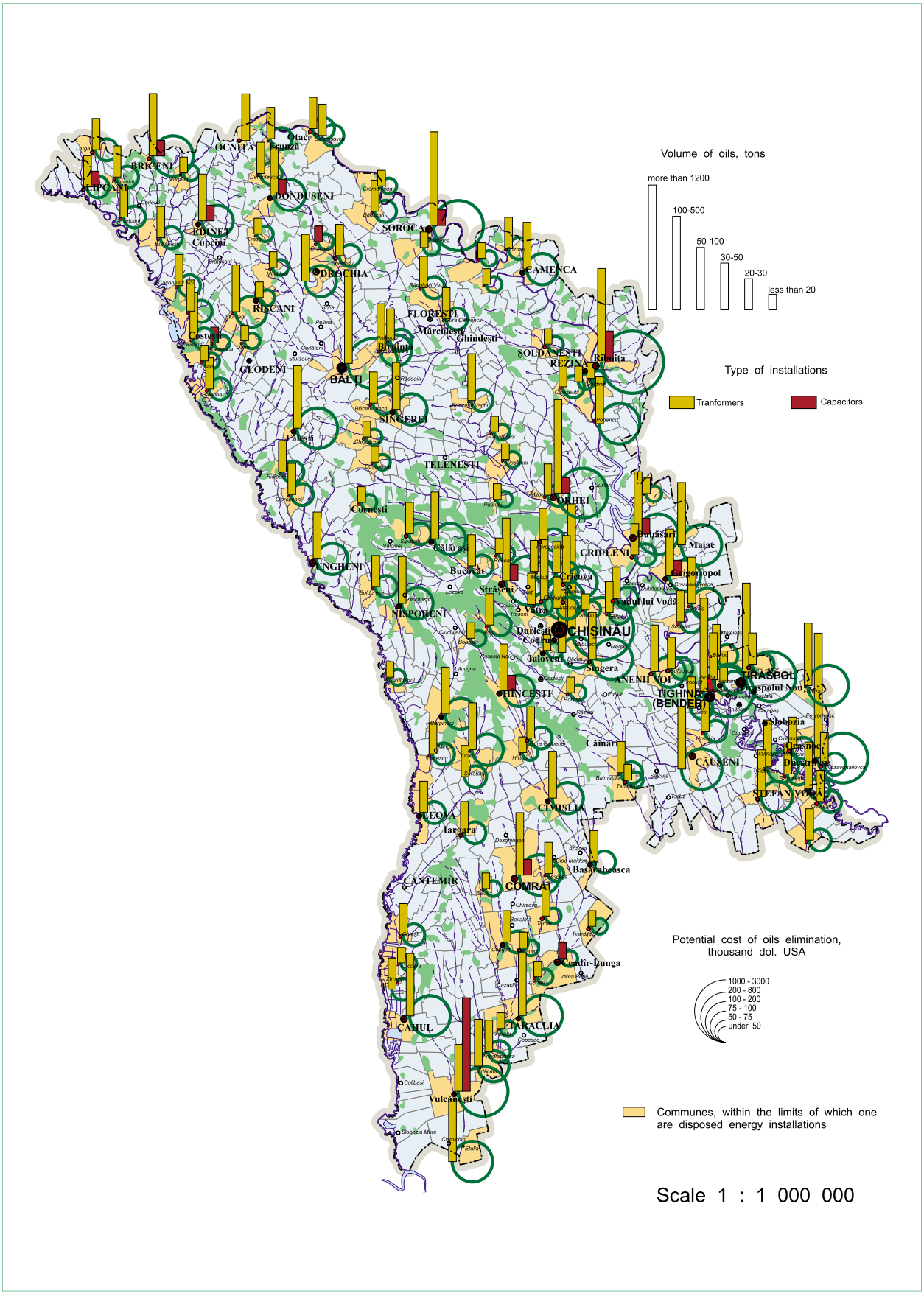


Figure 3. VOLUME OF OIL IN ENERGY INSTALATIONS (potentialy contaminated with PCB)

- Currently there are no specific legal requirements as regards PCBs import/export, storage, labelling, transport, and no operational guidelines were developed for these fields.
- There appears to be no clear ownership and accountability of PCB issues for activities under the authority of Ministries other than the MENR.
- Compliance with the Convention will require problem definition; setting and maintaining inventories; design and implementation of remedial measures
- There are very few data on PCB oils in use or awaiting destruction or disposal; PCB-containing or contaminated equipment and other wastes, stockpiles and contaminates sites; PCB containing products or other (non-energy) equipment.
- Options for appropriate destruction or disposal of PCBs have not been explored in Moldova.
- Environmental authorities do not appear to have a clear focus for environmental control of PCBs.
- Regular PCBs monitoring does not exist and laboratory capacity is insufficient.
- PCB awareness level of decision makers appears to be very low.
- No surveys of stockpiles, wastes and sites contaminated by PCBs were conducted to determine to which extent such sites present a threat to the environment and human health in the near and longer term.

4.5. Assessment of DDT Issues

DDT has never been produced in Moldova. Its use was forbidden in 1970; currently DDT is not listed in the official register of permitted substances for use in agriculture, forestry and household. Illegal import of DDT is unlikely, since: (1) it could not be legally used; and (2) DDT is no longer seen as an essential pesticide, since a number of effective alternative pesticides are in use. Over the last decade, DDT concentrations in the environment have constantly decreased. The results of the long-term monitoring of DDT residues in soil show a clear downward trend after the peak was reached in the 1980s. The same tendency has been recorded in the surface waters. According to investigations by HMS, the maximum concentrations of DDT residuals detected in surface waters decreased from 8-10 ppb in the 1980s to 0.0-0.01 ppb in 2002.

Concerning DDT stockpiles, a reported amount of 654.1 tons is buried at the Cismichioi pesticide dump. The investigations carried out in 1999 in the framework of the Tacis project „Selected Actions for the Protection of the Danube River Basin" showed that surface soils within and adjacent to the site are contaminated with residues of DDT and its metabolites. The study reported strong evidence that pesticide residues from the dump are being mobilized through exposure of contaminated surface soils and by leaching from the dump into groundwater.

Due to the fact that DDT has been prohibited over 30 years ago and its imports have stopped in the yearly 1970s, all shipment and contractual information has been lost, thus making desk assessment impossible. At the same time, according to some experts, DDT might still be used in some rural households, which do not possess knowledge of the composition of obsolete stock they might have preserved.

The review of the findings of DDT assessment against the provisions of the Stockholm Convention revealed a number of problems similar to those applying to other POPs pesticides described under item 4.3.

4.6. Assessment of Unintended POPs[15] Releases (PCDD/ PCDF, HCB and PCBs)

No comprehensive study to identify the releases of PCDD, PCDF, PCBs and HCB has been ever conducted in the Republic of Moldova.

The UNEP *Standardised Toolkit for Identification and Quantification of Dioxin and Furan[16] Releases was*

[15] Four POPs substances to be controlled via the Stockholm Convention are produced unintentionally as by-products or trace contaminants. These are: polychlorinated dibenzo-p-dioxins (PCDDs); polychlorinated dibenzofurans (PCDFs); polychlorinated biphenyls (PCBs); and, hexachlorobenzene (HCB). Two of them, namely PCBs and HCB, have also been produced for specific purposes (PCBs as dielectric fluids etc. and HCB as a seed fungicide).

[16] Dioxins and furans are amongst the most toxic substances known to man, and normally they are not intentionally produced. They are usually generated and subsequently released through a number of anthropogenic and natural activities. Anthropogenic sources include a broad range of industrial and combustion sources. PCDDs and PCDFs have been detected in effluents from municipal effluents, waste incinerators, cement kilns, steel plants, wood combustion etc.

▲ Storage conditions. Sacks with obsolete pesticides.

used to make a preliminary inventory of these substances in Moldova. Various sources released 42.6 g TEQ of PCDD/PCDF into atmosphere, water and land in 2001. According to the inventory, 47.6% of total PCDD/PCDF releases resulted from wastewater; 35.9% from power generation and heating, 6.6% from uncontrolled combustion processes (fires/burning of biomass).

Over the period of 1990-2001 total PCDD/ PCDF releases to the atmosphere, water and land decreased by 83.8% (from 263.1 g TEQ to 42.6 g TEQ). At the same time, it can be foreseen that national economic recovery could bring a significant increase of PCDD/PCDF releases. Therefore appropriate measures have to be taken to identify the hot spots and to target limited available resources at prevention and limitation of emissions from priority sources.

Emissions of *PCBs* (as unwanted by-products[17]) in Moldova amounted to 16.24 kg/year in 1990. The main emission sources were heavy-duty vehicles, buses and lime production. During the last decade PCBs releases declined sharply (up to 2.10 kg/year in 2001).

There are no data available on current and historic emission levels of *HCB*[18] *in Moldova. In 1990, HCB releases in Moldova were assessed at 0.025 kg, and the main emission source was cement production (99%). In 2001, releases were estimated at 1.0 kg. The main emission source was secondary aluminum production (99%).*

Significant uncertainties regarding quantification of releases of un-intended and by-products POPs must be stressed. These are due to the lack of reliable and continuous monitoring, analytical methods and equipment, both in the public and private sectors.

The National Program for Environmental Safety asks for developing and implementing emission limit values for unintentional POPs. However, due to lack of capacity (equipment) to monitor and analyze such emissions, this task looks unrealizable in the near future. Besides, there appears to be a regulatory gap with respect to responsibilities for managing releases (especially PCBs) from industry. There are no existing inventories of industrial plants or factories known to release HCBs, PCBs, dioxins or furans. Many surveys will be required to garner a clear and precise definition of the problem. This will also likely require the establishment of consultative mechanisms and partnerships and the cooperation of many

[17] PCB can be classified under two source categories: as deliberately used industrial products (discussed above) and as unintentional products. PCBs are a common contaminant in emissions from combustion sources. At low combustion temperatures and inadequate combustion chamber residence time, PCBs are volatilized and released to the local environment where they condense and contaminate the surrounding area.

[18] HCB was originally used as a fungicidal seed treatment. As a fungicide, it is not allowed for use in Moldova, and reportedly it was not extensively used in the past. HCB sources also include: emissions from incineration; leachate from hazardous waste dumps; emissions from various industrial sources; effluents from municipal wastewater treatment plants and long-range transport and deposition.

Ministries. This activity is a prerequisite to developing an implementation plan to achieve compliance.

The review of the findings of unintended POPs assessment against the provisions of the Stockholm Convention revealed the following problems:

- There appears to be a regulatory gap with respect to responsibilities for managing releases from industry.
- There are no existing inventories of industrial plants or factories known to release HCBs, PCBs, dioxins or furans.
- There are no data on process-related releases from the industry sector, medical incinerators, and/or sewage treatment plant discharges.
- Currently there are no emission limit values for unintentional POPs.
- Lack of capacity to monitor releases of unintentional POPs.

4.7. Requirements for Exemptions

The MENR and the Stockholm Convention national focal point sought suggestions from relevant government agencies and it was unanimously acknowledged that Moldova did not need exemptions as specified in Art. 4. At the same time, with national and sector-wide privatization almost completed, the majority of industrial and agricultural production is concentrated in the private sector. In this regard, MENR shall continue consultations with major private industrial and agricultural producers, manufacturers' and consumer associations to seek whether some exemptions might be requested by the private sector.

4.8. Existing Monitoring Programs

Several laboratories, centers, institutions and departments are involved in monitoring activities regarding pesticides (including POPs) in Moldova. The *State Ecological Inspectorate* (SEI) is in charge of compliance monitoring and pollution control. The main focus of the SEI is analysis of pollutants in discharges and in the environment in the vicinity of pollution sources. The Inspectorate has six certified laboratories (one central and five regional) with skilled staff. However, an evaluation of laboratory capabilities undertaken in 2002 in the framework of the World Bank Environmental Compliance and Enforcement Capacity Building Project revealed that the analytical instrumentation in all laboratories is extremely obsolete and none of them is equipped for adequate analyses of organic micropollutants (which include the POPs) in water, air and soil samples. Since the laboratories do not participate in the national/international inter-laboratory

▲ Power Plant Nr.2, Chisinau

comparisons, the quality assurance/quality control issues are of concern[19]. A modern gas chromatograph with FID and ECD detectors was recently supplied to the central laboratory in Chisinau in the framework of the mentioned project, increasing its capability for high-precision measurements of POPs pesticides and PCBs. In 2002-2003, the SEI undertook a survey of old pesticides storehouses and investigated the level of contamination of adjacent areas with organochlorinated pesticides, including DDT, in the Nistru River basin.

The *State Hydrometeorological Service* (HMS) monitors background air, water and soil quality to assist in the formulation of pollution control measures. It has certified laboratories for water and soil analyses, which regularly participate in international quality assurance and quality control schemes. The HMS is running programs of pesticide monitoring in soil and water. The most comprehensive program involved the investigation of DDT and DDE residues in soil since 1979. The results showed a clear downward trend after the peak was reached in the 1980s. The same tendency has been recorded in the surface waters. The HMS has a comprehensive network of sampling stations covering all major water courses and water bodies and monitoring a range of some 35 parameters, including DDT and other pesticides. Water quality reports are sent regularly to national authorities and also to the Secretariat of the Danube Protection Convention. At the same time, air monitoring is deficient due to a lack of equipment for measuring POPs pesticides.

The *Ministry of Health* is responsible for monitoring in relation to human health. The MOH has an extensive network of regional laboratories in the Centers for Preventive Medicine (CPMs) carrying out a significant number of analyses of foodstuffs, agriculture soils, air, drinking water and surface waters for pesticides residues. It is also responsible for occupational health issues related to pesticides use. The National Center for Preventive Medicine in Chisinau has a fully equipped laboratory with trained staff, capable of carrying out sophisticated analyses. The laboratory has national certification and its results are mutually recognized by the health authorities of Russia and Ukraine. Several other CPM laboratories in the country are also quite well equipped and staffed.

Several other institutions have the technical capacity for POPs pesticides analyses (e.g. the Center for Agrochemical Service of the MAFI, the Institute of Geophysics and Geography of the Academy of Sciences), but these are not regular and depend upon demand from interested clients. Private enterprises and farmers do not have technical capability of analyzing POPs, in particular pesticides, and they usually contract certified laboratories for doing that. Currently, the industries and the energy sector do not have the obligation of self-monitoring in respect of specific pollutants like PCBs or PCDD/PCDF, since those are usually not listed in environmental permit requirements and, on the other hand, no national environmental quality standards have been established for some of them.

Coordination and exchange of information among the monitoring agencies is sporadic and is usually the result of the individual initiative of technical experts within those institutions. Despite several signed agreements (e.g. the Agreement on cooperation between the MECTD and the MOH signed in 2000), currently there are no operational channels of information exchange between the parties. This generates duplication of efforts, on the one side, information gaps, on the other side, and does not allow relevant information to be used in decision-making.

The Government attempts to integrate existing sectoral monitoring frameworks and to canalize gathered information into the decision-making process so far resulted in setting different "national" monitoring systems, which basically involve the same institutions (CPMs, HMS, SEI, MAFI) and suffer from the same overlapping. Besides, proposed systems often remain on paper only, since their implementation is hindered by lack of funds[20].

In conclusion, currently only investigations over DDT and its metabolites are regularly carried out in Moldova. Other pesticides included in the POPs list of the Stockholm Convention (aldrin, dieldrin, chlordane, endrin, heptachlor, mirex, toxaphen, and hexachlorobenzene) are not monitored at national scale. A significant amount of data on POPs pesticide exists within the country, but appears

[19] Upgrading Compliance Monitoring Capabilities of the State Ecological Inspectorate. Final Report. June 2002. Environmental Compliance and Enforcement Capacity Building Project, The World Bank.

[20] See, for example: GRM Decision No. 477 of 19.05.2000 on the approval of the *Regulation on the national network of laboratory observation and control over the pollution of the environment with radioactive, toxic and bacteriological substances*; and GRM Decision No. 717 of 07.06.2002 on the approval of the Concept of organization and functioning of social-hygienic monitoring in the Republic of Moldova and the Regulation on the social-hygienic monitoring in the Republic of Moldova.

▲ Destroyed storehouse, Lapusna, Hincesti rayon

fragmented, making future reporting obligations more difficult than necessary.

Analyses of PCBs are sporadic, since no pressure is made on the energy sector and industries by the environmental authorities as regards self-monitoring, reporting on PCBs and PCB-contaminated equipment, etc.

At present, there are no Government inventories of industrial plants or factories known to release dioxins or furans. The very few analyses of dioxins and furans in Moldovan environment were done for scientific purposes and by NGOs, and the samples have been analyzed in western laboratories.

The assessment of existing POPs monitoring programs revealed the following problems:

- From the POPs list of the Stockholm Convention only DDT and its metabolites are regularly monitored at national scale. Data on other POPs are fragmentary and scattered among different institutions.
- Coordination and exchange of information among the monitoring agencies is sporadic. Currently there are no operational channels of information exchange between the parties.
- The general laboratory capacity is insufficient, especially for PCBs and unintended POPs.
- Quality assurance/quality control issues are of concern, since the equipment in many laboratories is obsolete, training of staff is episodic and inter-laboratory comparison exercises are not undertaken.
- Data handling and analysis procedures are deficient, preventing the possibility to use gathered monitoring information for decision-making.
- Currently, the industries and the energy sector do not have self-monitoring obligations concerning specific pollutants like PCBs or PCDD/PCDF.

4.9. Economic Assessment

Moldovan economic development is crucially dependent on the environment and natural resources. At the same time, however, economic growth (development) is accompanied by significant adverse environmental and social impacts and consequences. There is no denying that POPs air, water and soil pollution (and food contamination) leads to serious negative impacts on health and various economic goods and services. The socio-economic costs resulting from environmental and natural resources damage and degradation are real and hard-felt, particularly by the poor. Most of the people in Moldova work on land and are directly dependent on natural resources for food, shelter and employment, i.e. their short-term and long-term welfare is inextricably dependent on and tied to the quality and productivity of natural systems.

During NIP preparation, an attempt was undertaken to make an economic evaluation of POPs-related environmental and health impacts (costs) and benefits resulting from implementing various mitigatory and management alternatives. Due to lack of reliable environmental monitoring, epidemiological and population data, and its time and spatial dimensions, it was difficult to establish and quantify direct doze-response and other relationships between individual POPs and measurable environmental and health effects. Currently in Moldova market prices and the market place do not adequately capture and reflect the full value to the society and the private sector of the full spectrum of potentially POPs-associated impacts and consequences, as well as of undertaking precautionary, mitigatory, prevention and rehabilitation actions or using particular resources, so-called “externalities”.

Furthermore, internationally acceptable economic evaluation methodologies are not used in Moldova, and necessary monitoring and research data and information is lacking.

As necessary information and data were not readily available, a "*benefit transfer*" approach was used where estimates obtained in other but similar context were used to estimate the range of costs under various alternative options to manage and address problems associated with the POPs regulated by the Stockholm Convention. Economic evaluation of POPs-related environmental damage was based on the inventory data, using standard Moldovan methodologies and approved national norms for natural resources use charges and environmental pollution payments. Total environmental damage from POPs was estimated to be about MDL 96.6 million in 2001 (about US$7.2 million.) Total POPs-related health (damage) costs were estimated, using international comparable health effects data, to be about MDL 78.8 million (about US$5.8 million.)

Cost-benefit analysis looked at "no project" scenario, i.e. when no POPs mitigatory measures are undertaken. In this case, total (environmental and health) POPs associated (damage) costs would be about MDL 175.4 million (US$13 million.) "With project" scenario, i.e. total POPs mitigation benefits, was not attempted to be evaluated at this stage, as it was impossible to precisely estimate the total cost of all proposed alternatives to address there types of regulated POPs.

At the same time, an attempt was made, using internationally available estimates of various techniques, to estimate costs of mitigating PCB-related problems related to clean-up and destruction of about 14000 obsolete capacitors and 26000 various transformers, waste oils, etc. It was concluded that the total cost for a 6-12 years long clean-up and destruction of PCB contaminated equipment, assets and oils will be about US$34 million, i.e. about US$2.8-5.6 millions annually, provided PCB mitigation equipment and technologies have been procured and installed in Moldova. Obviously, the total cost may be lower or higher in cases when PCB mitigation will utilize leased equipment and/or on the territory of third countries, which already have necessary facilities. Depending on the selected method for mitigating pesticides-related pollution and obsolete stocks controlled storage, land-filling or destruction, the total cost was tentatively estimated to range US$2-8 million, spread over a period 4-6 years, i.e. annual costs topping US$1.3-2 million[21].

In addition, it is anticipated that there will be an impact in terms of increased administrative burden, due to the managing of various project activities, certain notification and reporting obligations, etc. Thus it is evident that, during the life-time of NIP implementation, annual benefits from implementing POPs mitigation activities, at least for POPs pesticides and PCBs, will significantly exceed projects costs by US$5.6-8.9 million. The total costs have to be weighted against the benefits. The NIP contributes to elimination of the most harmful substances of global concern.

4.10. Impacts of POPs on Public Health and the Environment

Among the pesticides that have been used in Moldova in the past, the organochlorinated pesticides (OCPs), which include all the pesticides listed in the POPs Convention, are thought to pose the biggest health and environmental risks due to their toxicity, persistence and bioaccumulation potential. In the 1990s, their use in Moldova almost ceased. However, their intensive use in the past, their persistence in the environment and the related health risks still make of them a health and environmental issue.

The intense use of OCPs in the past, which reached a peak in the 1970s, caused pesticides accumulation in and contamination of soil and crops. Presently it is well-known that some OCPs can persist in the soil for 10-20 years and more. This explains why DDT is still detectable in the Moldovan environment, despite the fact that it was banned in 1970 and was not used in significant amounts since then.

Poor enforcement of specific rules and working instructions related to pesticides storage, transportation, preparation, use, etc., as well as insufficient awareness of the population on the health risks associated with pesticides, leaded to multiple violations of the regulations on handling toxic substances, including uncontrolled pesticide use on

[21] Due to uncertainty regarding the final selection of the most cost-effective and politically feasible mitigation option, a "benefit transfer approach" was used, where the estimates obtained in other but similar contexts were used to come up with a cost-range for various internationally available clean-up and destruction technologies.

▲ Access to obsolete pesticides is denied. Warehouse in Pascani, Hincesti rayon

the individual plots of farmers. This led to occupational health problems for many people directly involved in pesticides handling. This also contributed to the pesticides entering the environment and circulating in the food chains. In the 1980s, the frequency of detected pesticide residuals (including DDT and HCH) in Moldovan foodstuffs was pretty high, ranging from 5.6% (1984) to 19.8% (1990). The most contaminated were fruits, canned goods, dairy products and meat. The contamination frequency decreased during the last decade, but still data from 2000 indicated that pesticide residuals were present in 3.1% out of about 12,000 analyzed samples of food crops.

Investigations undertaken in Moldova by health authorities in the peak period of pesticide application denoted a significant exposure of humans to OCPs. HCH and DDT were identified in the breast milk of women living in villages where significant amounts of these pesticides were applied[22]. The vast majority of breast milk samples (between 87% and 96% in different villages) have been proved to be contaminated. The concentrations of pesticides in body fluids showed a clear correlation with the level of pesticide application in the fields. The toxic effects of OCPs on exposed people included reproductive dysfunctions and other functional disturbances in women, as well as increased frequency of masculine sterility, the incidence of both being related to the level of pesticides use.

Epidemiological studies also revealed a correlation between the level of OCPs use in previous years and the morbidity through chronic hepatitis and liver cirrhosis in the investigated areas of Moldova. Research findings identified a strong positive correlation between the general level of pesticides use and infant mortality. The demonstrated chronic effects on children and teenagers related to pesticides application included immune system disruptions, as well as physical and mental retardation. The comprehensive estimation of health status revealed an evident general worsening of children's and teenagers' health indices in areas with high level of pesticides application.

It is considered that as a result of excessive use of pesticides in Moldova during the last decades, the health status of at least two generations was affected. The burden of morbidity resulted from the acute and chronic effects of exposure to organic chemicals is significant in Moldova and has important social and economic costs. Prevention of further exposure of the population to POPs pesticides is one of the public health imperatives.

[22] Volneanschi A., Romanciuc P. *Hygienic evaluation of the content of organochlorinated pesticides in breast milk* (Rom.) Proceedings of the III Congress of hygienists, microbiologists, epidemiologists and parazitologists of the Republic of Moldova, Chisinau, 1992. P. 68-70.

Starting with the land reform in the mid 1990s, the number of large pesticide users (agriculture farms) was in a continuous decline. Consequently, the number of people professionally exposed to pesticides at the work place also dropped from 34,700 persons in 1993 to 8,800 in 2002. This does not mean, however, that the total number of exposed people decreased in the same proportion, since many peasants continue to apply pesticides on their individual plots in smaller amounts and under less controlled conditions. This might in fact have increased the risks of pesticide use, instead of decreasing them.

The assessment of impacts of POPs on population and the environment revealed:

- Lack of comprehensive and reliable environmental monitoring and epidemiological data, making it difficult to establish and quantify direct doze-response and other relationships between individual POPs and measurable environmental and health effects.

4.11. Social Assessment and Activities of Non-Governmental Organizations

Country-driven Rapid Social Assessment (RSA) was used during NIP preparation to: identify stakeholders; increase stakeholders' ownership; clarify and prioritize POPs-related social issues (poverty, age, ethnicity, gender) and project objectives and goals; define responsibilities and build broad-based commitment to the project outcomes. RSA provided a means for achieving and securing public involvement and participation. It also sought to answer key POPs NIP-related questions and thereby improve decision-making, and helped address a variety of social factors that would be critical to NIP implementation success. RSA is an on-going process that should take place throughout the NIP cycle.

The range of stakeholders that were consulted during POPs NIP design included: the GRM, MENR, acting as the executing agency, other ministries and local administrations; the Parliament and its relevant standing commissions and deputies; selected public and private enterprises, and owners of relevant assets; Academia; affected local communities and NGOs representing their interests; the World Bank, GEF and international and bilateral donors. Local experts and NGOs were used as intermediaries between the government, affected communities and local civil society; they also carried out the RSA.

▲ Free access to obsolete pesticides

Both the GRM and the Parliament seek to find practical solutions to or at least mitigate immediate adverse environmental and health impacts of dilapidated (and leaking) pesticide storage facilities, scattered all over the country. Three GRM resolutions were approved to this effect, outlining various alternatives to collecting and sitting obsolete pesticide storage facilities. None of these decisions were implemented, due to lack of funding and opposition of local population, which was not informed of and engaged in decision-making. The Parliament conducted a special session on obsolete pesticides and had a number of special hearings and meetings with local populations (these have been repeatedly covered by national TV and media).

At the same time, it is also quite obvious that POPs problems are not on the top of the national agenda, due to severe financial constraints, limited and inconsistent commitment of the political elite, and due to inadequate understanding of the interrelationships between POPs pollution and public

health and poverty elimination. While MENR and MOH seem to consistently and proactively champion complete and final resolution of POPs (pesticide) related problems, other agencies do not see the resolution of POPs problems as one of the building blocks in achieving national sustainable development and poverty elimination, including assuring sustainable food production, reliable quality water supply, sanitation and waste management, and fostering public health.

Few stakeholders are aware of POPs-related problems (e.g., only 3% of survey respondents were aware of POPs[23]), seriously concerned with various negative environmental and health impacts, and see POPs mitigation and elimination as a priority. Others, while appreciating the seriousness of potential problems, do not place comprehensive POPs mitigation and management among the daily life priorities. Awareness of PCB/dioxin/furan-related environmental and health problems is almost non-existent and does not come even close to the top of public or private priorities.

Poor POPs awareness and ignorance of various groups, like farmers, enterprise employees, children, or students is related to: lack of institutionalized communication channels and experienced and credible PR staff, ineffectiveness of existing information environmental dissemination, communication and education, distrust of and even hostility towards public authorities, fear of prosecution and reluctance, due to censure, of local population to articulate their concerns. Most vulnerable and poor groups of population are mainly concerned with their daily survival and showed almost total indifference towards POPs (chemical) pollution and its impacts on their health. Mass media was cited as the primary sources of POPs-related information, while environmental and local authorities and NGOs were ranked 2nd and 3rd, respectively.[24]

There are over 2000 NGOs registered in Moldova – over 50% of them exist only on paper, the remaining ones have 1-2 members, and only 20-30 NGOs are rather actively involved in environmental and social activities, increasingly with the technical and financial assistance from the Regional Environmental Center (REC). It is acknowledged that most NGOs do not have technical capabilities to generate their own environmental research and information gathering, and are using data available from public agencies and academia. Many NGOs shape their activities to match the priorities of international donors rather than build on and address concerns of local communities.

[23] Bivol, Elena and Ciubotaru, Valentin, Report on the Survey on Main Public Concerns Regarding POPs in the Republic of Moldova, Chiºinău, 2003, p.4.

[24] Renita, Alecu, Victoria Resetnic and Victor Stratila, *Report on the Survey on Main Public Concerns Regarding POPs in the Republic of Moldova, Ecological Movement of Moldova*, Chisinau 2003, p.5.

5. STRATEGY

The overall country society is deeply and rightly concerned about harmful chemical substances, including POPs entering, staying in and destroying their environment. POPs and other chemicals in air, water, soil and sediment can end up in the food chain, upon which all living beings, including humans, depend for their existence. The national policy regarding POPs chemicals is driven by understanding that a national chemical safety management system needs to be created for applying a precautionary, prevention and polluter pays approach in identifying chemicals pressures and impacts, in assessing remediation options and in implementing cost-effective measures to prevent environmental degradation and negative societal, particularly health, impacts.

The range of POPs chemicals concerns, highlighted by the Stockholm Convention, is considered as country priority for the time being, and should serve as a triggering mechanism for the modernization of the current national chemicals management system towards an environmentally sound management of toxic, persistent, harmful and bio-accumulative substances in all spheres of human society. Minimization and final elimination of POPs related pressures and impacts to the natural and human environment is an integral part of national environmental policy. It is considered that environmentally sound management of chemicals, if being adequately set up and functioning, is an important element contributing to the well-being of the country, society sustainable development and poverty alleviation. Adequate solving of POPs pesticides problems, as well as sound management of other prohibited and unused agricultural chemicals, is considered to be helpful for the promotion of Moldovan ecologically clean agricultural products world wide.

The national policy is calling for phased approach and well developed implementation plans for the solving of significant treats related to wide spectrum of chemicals' harms and dangers.

The policy has two key management objectives:

- Remediation and virtual elimination from the environment of POPs that result predominantly

▲ Urgent remediation needed.

from human activity and that are persistent and bio-accumulative; and

- Management of other toxic substances and chemicals, throughout their entire life cycles, to avoid, prevent or minimize their release into the environment.

The policy recognizes the need to apply a precautionary, prevention and polluter pays approach in identifying POPs and implementing cost-effective measures to prevent environmental degradation and negative societal, particularly health, impacts.

Currently, the overall national policy goal is minimize POPs related treats to the environment and public health by means of better management options, which should serve as an example, skeleton and operational model for further widening and development of chemical safety management system in Moldova.

Country Strategy

The country strategy for the establishing of nation-wide chemical safety management system and the solving of POPs priority problems is based on the policy stipulations and includes integrated strategies in the following spheres:

Policy

- Obligations under the Stockholm Convention are only a subset of broader international obligations of Moldova, which may be defined as "environmentally sound and integrated management of chemicals". The links and operational platform between the Stockholm Convention, the Aarhus Protocol, the Basel Convention, the Rotterdam Convention and other relevant international conventions should be established.
- The national environmental and sectoral policies, strategies and programs should be modernized and must reflect POPs priority elements, as well as other dangerous and toxic substances management issues. The flexibility mechanisms shall be built-in to allow timely and efficient adjustment and updating when warranted. The policies, strategies and programs shall provide prioritization of action, based on cost-benefit analysis and potential threat of POPs to human health, welfare and the environment.

Legislation

- Existing regulatory gaps have to be filled-in and legislation has to be amended to ensure cross-sectoral and media consistency and timely transposition of international obligations. The legislation shall address some specific POPs issues, which are not currently covered by existing legal and regulatory framework, both at the national and sectoral levels.
- Implementation regulations, procedures, standards and guidelines shall be drafted in an integrated manner, clarifying monitoring, reporting, control, implementation and enforcement re-

▲ Clean-up of warehouses is planned.

▲ Destroyed warehouse: looking for low cost sollutions.

sponsibilities of the respective ministries and agencies, and creating a unified and integrated computerized system of tracking regulated POPs, dangerous & toxic substances and other chemicals throughout their life cycle.

- The revision of the environmental standards related to the management of hazardous chemicals will focus not only on numerical values, but on a broad reform encompassing the principles and the legal basis for standards setting. The provision and stipulations from legal and regulatory acts should be also transferred to the practical and operational guides, as well as presented for the general public in simple and understandable mode.
- The number of regulated polluting substances should be limited to these: with the highest threat to human health, regulated under applicable international obligations, and that can be effectively monitored with the limited technical capacity and human resources available.
- An integrated environmental permitting should be developed, consistent with the applicable EU requirements. Provisions for BAT and BEP, regarding POPs sources (new and existing) should be clearly addressed in legislation.

▲ Example of guarded pesticides and fertilizers storehouse. Chisinau mun.

▲ Obsolete pesticides before repackaging.

Administrative Management

- To support activities of implementation of the Stockholm Convention and of other international conventions in that field, the MENR should consider the possibility of creating a Center for Chemicals Management (CCM) to coordinate and manage Moldovan international obligations under the Basel, Stockholm, and Aarhus Protocol to LRTAP and potentially the Rotterdam Convention, thus attracting the investments and technologies for the implementation of the international treaties and for the NIP, and gaining synergies, as well as improving and increasing efficiency, cost-effectiveness, transparency, accountability and cross-fertilization.
- POPs-related obligations of various ministries and agencies require focusing, fine-tuning of authority and responsibilities, as well as better coordination and proactive cooperation – the MENR shall be assigned lead responsibility and given relevant powers to ensure enforcement.
- A possibility of creating a centralized computerized system – a unified databank (integrating information and data from various registers, lists, sectoral monitoring systems of different hierarchy), based on upgraded centralized monitoring and laboratory capabilities and complemented by focused training of selected staff, should be explored.
- Coordination, compatibility and integration of monitoring, laboratory and control capabilities shall be enhanced, in order to improve POPs cycle information and data management and facilitate more effective and efficient national programming, planning and decision-making.
- Environmental audits should include POPs concerns and should be used more extensively and consistently to review performance, collect data and develop mitigatory plans for various economic entities, as well as identify and assign environmental liabilities.
- Improve DOC system for POPs import, export and transit tracking and reporting, monitoring, control and enforcement, including computerized and integrated information and data management and sharing, particularly regarding labeling and compliance with licenses' and permits' stipulations on quantities and consistency of brand names/chemical compositions.

Financial Mechanisms

- Explore opportunities for POPs-related investments and technical assistance, as well as for utilization of existing projects financed by international and bilateral financial institutions in various sectors, like agriculture, energy, and transport. Implementation of joint nationally and internationally supported efforts is a strategic pathway for solving POPs and other chemicals issues in Moldova.
- Plan a phased increase in public environmental expenditures parallel to overall economic recovery, or, at least, ensure timely release and efficient execution of budgetary allocations for priority POPs issues. It is important to establish sustainable co-financing and contributing platforms between national, regional and local sources, government and private ones, national and international financial flows.

- Provide incentives to increase the share of local public and private sector financing in the management of local, enterprise and site-specific POPs and other priority chemicals related environmental problems.
- Streamline environment-related taxation and improve collection, expand economic incentives, increase fines for POPs and other chemicals pollution, as well as for non-compliance to reflect the scarcity of natural resources and significance of environmental and health impacts; these should be timely indexed to reflect inflation rates.
- To support implementation of Stockholm Convention related activities, GRM and MENR should increase annual allocations from the national and local sources, including environmental non-budgetary funds.

Human Resources

- Strengthen and improve chemicals safety skill-mix of the MENR, MAFI, MOH, MOE, MOD, DOC and related agencies' systems with well-trained environmental professionals, including senior managers, technical and media experts, economists and lawyers.
- Ensure integrated development of country resources at various levels (national, regional, local), including all players (governmental agencies, public authorities, private sector, general public) in decision making, sharing of responsibilities, training and educational programs.
- Increase the role of local public authorities, providing managerial skills and financial authority for POPs and other harmful chemicals combating efforts.
- Seek negotiating bilateral (twinning) agreements with the respective environmental agencies for technology, know-how transfer and training.

Acknowledging that meeting the Stockholm Convention requirements is an important step towards ensuring the overall national chemical safety, the strategic approaches of Moldova in this field can be formulated as follows:

- Step by step approach, followed by good planning and definitive agreements between stakeholders, beneficiaries and financial agencies is a prerequisite for the implementation of Stockholm Convention requirements. The NIP is a basis for relevant actions and negotiations with international financial institutes.
- Specific implementation actions included in the NIP should be focused on eliminating/reducing the priority health and environmental threats posed by POPs chemicals, by means of affordable and cost-efficient measures.
- The NIP should provide flexibility for implementation mechanisms and operational plans, and implementation agencies should have a sort of maneuvering, in order to reach established national goals timely and efficiently, but strictly considering the principles of safe and environmentally sound measures.
- The NIP should be periodically evaluated by means of established criteria and indicators, analyzed by stakeholders and revised if appropriated.

The strategic objectives pursuant to the requirements of the Stockholm Convention are:

Reduction of POPs Releases from Intentional Production and Use (Article 3)

- Prohibit production and use (except PCBs in equipment) and eliminate import and export of POPs chemicals listed in Annexes A and B, by the amending of legislation with clearly formulated provisions according to Stockholm Convention requirements until 2005.
- Establish a schedule for the elimination of the use of PCBs in equipment, according to Stockholm Convention priorities (Annex A, part II, a) after a clear assessment of PCBs content in equipment. Final elimination is scheduled by 2025.
- Implement step by step measures for reduction of exposure and risk from use of PCB-containing equipment, according to the priorities stipulated by the Stockholm Convention (Annex A, part II, b) after assessment of PCBs content in equipment.
- Prohibit recovery for reuse in other equipment of PCB-containing liquids, according to the Stockholm Convention requirements (Annex A, part II, d) by amendments of legislation until 2010, and establish environmentally sound waste management of liquids and equipments contaminated by PCBs not later than 2028.
- Identify PCBs content in other articles and manage them accordingly by 2025.
- Evaluate national options for specific exemptions according to the Stockholm convention requirements until 2005.
- Establish a mechanism for assessment of new pesticides and industrial chemicals (in accordance with POPs criteria) by 2007.

- Implement assessment of pesticides and industrial chemicals in use according to the POPs criteria until 2010.

Register of Specific Exemptions (Article 4)

- Follow up all requirements stipulated in the Stockholm Convention, since the moment when the Register will be officially established.

Reduction or Elimination of Releases from Unintentional Production (Article 5)

- Further investigation of sources and current management options regarding releases of chemicals listed in Annex C in order to prepare relevant Action Plan by 2006.
- Identify BAT and BEP for particular industry and sources by 2010 and introduce BAT and BEP for new sources since 2010.
- Promote measures to achieve releases reduction since 2006.

Reduction or Elimination of Releases from Stockpiles and Wastes (Article 6)

- Finalize collection of prohibited pesticides at district deposits during 2004-2006.
- Finalize the strategy for the identification of stockpiles consisting or containing chemicals listed in Annexes A and B and products containing POPs listed in Annexes A, B and C by 2006.
- Manage obsolete pesticides stockpiles and wastes in an environmentally sound manner following international standards and guidelines, according to the following scheme: (100% of POPs pesticides contained stockpiles and wastes since 2005, 25% of other stockpiles containing obsolete pesticides since 2006, 50% - since 2007, 75 % - since 2008, and 100% - since 2009).
- To establish a schedule for the managing of PCB-containing stockpiles and wastes in an environmentally sound manner, starting since the completion of the identification process, but not later than 2007.
- To establish a schedule for the managing of products containing POPs listed in Annexes A, B and C, starting since the completion of the identification process, but not later than 2009.
- Prohibit recovery, recycling, reclamation, direct reuse and alternative use of POPs listed in the Annex A (except PCBs) by legal provision since 2005.
- Prohibit recovery, recycling, reclamation, direct reuse and alternative use of PCBs by legal provision since 2006.
- Prohibit recovery, recycling, reclamation, direct reuse and alternative use of POPs listed in Annex C by legal provision since 2006.

Listing of Chemicals in Annexes A, B and C (Article 8)

- Monitor POPs candidates use and impacts and utilize internationally accepted experience and findings.
- Strengthen national capacity for chemical risk assessment and risk management by promotion of international cooperation and technical assistance.

Information Exchange (Article 9)

- Develop Communication Strategy and establish information exchange links to be implemented by MENR.

Public Information, Awareness and Education (Article 10)

- Facilitate and promote awareness and understanding of POPs information to the public, decision makers and other effected groups, basing on the Communication Strategy.

Research, Development and Monitoring (Article 11)

- Research and development strategy will have to be targeted and phased, showing a high degree of flexibility, in order to be easily adapted as new data will be gathered.
- Develop environmental and health oriented monitoring strategies and start step by step implementation since 2005, beginning with the priority areas, zones and concerns.

Technical Assistance (Article 12)

- Promote extensive and POPs specific Technical Assistance Program by accelerating the negotiation process with the international community, and involve potential international financial sources and technology transfer options.

Financial Sources and Mechanisms (Article 13)

- Promote POPs related Investment Program by accelerating the negotiation process with the international community, and involve potential international financial sources.

6. ACTION PLAN

The goal of the NIP is to ensure compliance with the national obligations under the Stockholm Convention and to reduce and eliminate risks to human health, the environment and national development from past, current and future exposure to POPs. The NIP seeks to encourage, facilitate and support, to the possible extent, national and local authorities in their efforts to collect and properly dispose POPs, as well as to remediate or contain sources of POPs pollution.

Moldova has developed this NIP and intends to use the full range of tools to prevent, reduce and eliminate releases and stockpiles of 12 POPs. These tools include international, regulatory, programmatic, voluntary, remedial, compliance monitoring and assistance, enforcement, and research tools. GRM will continuously analyze POPs pollutant sources and reduction options as bases for grouping pollutants, activities, and sectors to maximize efficiencies in achieving reductions. GRM will coordinate integration and sequence actions within and across national action plans, and will seek to leverage these actions on international and industry-sector bases.

▲ Repackaging measures will prevent releases.

▲ The roof of the pesticides warehouse need to be repared.

▲ Site remediation measures as part of planned actions.

6.1. Priority Setting

The determination of NIP priorities included the following steps: defining the process and methodology, selecting the ranking criteria, consulting NGOs and stakeholders, validating identified priorities, and transferring priority areas to the NIP objectives. A wide spectrum of stakeholders participated in discussions on which problems are most critical and what measures would be most appropriate for the implementation of the Stockholm Convention and NIP development.

The following groups of criteria were selected to be used for ranking POPs priorities: (i) direct benefits to the public and environmental health, as well as economic and social benefits; (ii) magnitude of the problem at different levels (international, national, local); (iii) perception by different stakeholders (international community, central and local governments, NGO and the general public, businesses); and (iv) affordability & availability (technology, infrastructure, staff, financial perspective). The list of Stockholm Convention requirements was assessed against the selected criteria, and five priority areas and respective NIP objectives, important for Moldova in a short-term perspective, were identified:

1. Manage stockpiles (pesticides and PCBs) and wastes (all chemicals under Convention) in a safe, efficient and environmentally sound manner, in order to reduce or eliminate releases.

- To improve legal and regulatory framework for management of obsolete pesticides, supported by the development and introducing of management guidelines and practices.

▲ Luck of sound stockpiles management.

- To foresee incentives for rural communities showing the best results in managing pesticide stockpiles.
- To clearly delimitate responsibilities of all stakeholders for enforcement of legal requirements.
- To propose low-cost urgent measures for reduction of releases at the existing stockpiles (pesticides and PCBs), to re-assess and improve national capacities for safe collection, transportation and storage of obsolete pesticides and implement re-packaging and centralisation followed by the safe disposal of obsolete pesticides

2. Develop and implement strategy for identification of POPs-containing stockpiles, wastes and products/articles

- To improve POPs pesticides stockpiles and wastes inventory in respect of risk assessment issues.
- To improve PCBs stockpiles and wastes inventory in respect of clear identification of PCBs content and hot-spot identification.

3. Develop strategy for identifying and remediation of contaminated sites

- To strengthen national capacities for environmental monitoring and research of POPs content in the natural surroundings (soil, water, living organisms).
- To develop guidelines for contaminated site identification, including rapid assessment of sites, environmental risk identification, sampling and analytical methodologies.
- To implement a pilot identification of contaminated sites, test identification guidelines, and, if successful, create conditions for country-wide replication
- To assess feasibility, local acceptability and affordability of remediation options.

4. Promote and facilitate public information, awareness, education

- To ensure public information, develop specific education and awareness programs, set up mechanisms for public participation, maintain training efforts, involve industry and users, establish adequate information dissemination mechanisms.

5. Encourage/undertake research, development and monitoring

- To prepare realistic and needs oriented research, development and monitoring programs,
- To improve institutional framework and technical capacity for monitoring the POPs and monitor priority sources/major releases.
- To monitor release reduction as an indicator of NIP implementation.

The NIP will focus on short-term and urgent measures, while other Stockholm Convention requirements will be considered in a medium- and longer-term perspective after evaluating the implementation results and updating the document.

Given the financial constraints, favorable environmental living conditions in the country should be achieved by implementing actions that will bring maximum social, economic and environmental benefits for the given levels of expenditures. Considering this criterion, the NIP gives the highest priority to measures that mitigate the direct negative impacts on environmental health and human well-being. The NIP focuses primarily on the most affordable, low-cost activities, associated with actions for creation of sustainability, public involvement, and at the interest of the international community and government.

Severe economic and financial constraints limit the country's capability to achieve the expected level of POPs release reduction. Therefore, one of the country's first priorities is commitment of sufficient international financial resources, specifically for technical assistance and for resolving urgent problems posing significant threats to public health and the environment. Thus, an important focus of developing a policy framework should be finding new means and schemes for resource mobilisation and the financing of environmental expenditures, as well as addressing to other barriers for NIP implementation (lack of incentives for resource saving and environmental improvements, related to macroeconomic difficulties, weak environmental regulations and enforcement, the insufficient technical capacity of public institutions, deficiencies in information sharing and disclosure, and public outreach).

The intention of this NIP is to make the whole of the GRM's efforts on POPs pollutants more than the sum of its parts. NIP will derive from stronger multi-media coordination among national and sectoral programs, and through the significant involvement of stakeholders. Creation of institutional structure(s) capable to sustain such an approach is a clear current priority.

6.2. Proposed Actions

The NIP foresees a number of measures to be undertaken in the short-term, presented in the table below. A more detailed description is provided in Annexes 1-4. The proposed actions can be grouped in 4 categories, as follows:

1. Legal, Regulatory and Institutional Activities

These actions are targeted at amending the current legislation specifically related to the Stockholm Convention and incorporating provisions for establishing a broader chemical safety approach in the country. They also include drafting specific regulatory acts and supporting operational guidelines and practical handbooks. An important element is the creation of adequate institutional arrangements for the co-ordination of POPs related activities country-wide and the dissemination of experience gained for overall chemical safety aspects.

2. Capacity Building

This category includes actions related to the training of professionals and decision makers, improvement of POPs inventories, increasing the capabilities for hot-spots identification, reporting, monitoring and control, research and development.

3. On-ground Remediation Measures

These include the repackaging and centralisation of obsolete pesticides at the district storage facilities, the identification of the most appropriated solution for their final elimination, low-cost measures to minimise impacts from abandoned storage facilities, collecting old DDT stocks from the rural households, and remediation measures at the pesticide dump in Cismichioi and the stockpiles of out-of-use capacitors in Vulcanesti and other places.

4. Public Awareness, Training and Education

The measures responding to the most urgent needs refer to raising public awareness and ensure proper communication on POPs-related issues, and incorporation of POPs issues in educational programmes.

Table of Actions

Problem Area	Objectives	Proposed Action	Lead and Implementing Agencies	Timeframe	Status	Cost,* US$	Potential Sources of Financing
Legal, Regulatory and Institutional Activities							
1. Modification of legal framework	Provide a legal basis for POPs chemical management under the Stockholm Convention requirements and set up an overall chemical safety system	Revision of existing legal acts; identification of gaps; recommendations for amendments; stakeholders consultations.	MENR, MOH, MAFI, ME, DOC	2005	Proposal	75,000	GRM, international donors
2. Administrative set-up	Establish a platform for high political commitment, further chemical safety policy development, coordination and supervision of POPs related activities.	Amendment of the statute of the National Committee on Environmental Policy; study tour	MERN, other relevant ministries, public bodies, academia, NGOs	2005	Proposal	50,000	GRM, international donors

Problem Area	Objectives	Proposed Action	Lead and Implementing Agencies	Timeframe	Status	Cost,* US$	Potential Sources of Financing
	Coordinate and manage Moldovan international obligations under the Basel, Stockholm, LRTAP and Aarhus Protocol (and potentially the Rotterdam Convention) and to manage the NIP implementation.	Nomination of the National Focal Point for the Stockholm Convention within the MERN, exchange of information according to the provisions of the Convention and the initial actions of the Parties. Develop the project and create the Center for Chemicals Management (CCM); establish consulting support to CCM; improve the skills and managerial capacity of CCM staff; develop terms of reference and scope of its work for the implementation of the Basel, Stockholm, LRTAP and Aarhus Protocol; detailed design and tuning of NIP activities	MENR	2004-2009	Proposal	600,000	International donors, GRM
	Improve data management and reporting in the field of chemicals.	Establish an information system, procure hardware and software, train staff; set up statistical and reporting procedures (identification of information sources, setting reporting formats and information channels); establish PRTR	MERN, together with line ministries, AS, DSS	2005-2009	Proposal	350,000	International donors, GRM
3. Development of regulatory mechanisms	Transfer the POPs related legal provisions into practical and management tools.	Draft regulations; stakeholders consultations	MENR, MOH, MAFI, ME, DOC	2004-2006	Proposal	75,000	GRM, international donors
4. Drafting of guidelines and handbooks	Support the legal and regulatory framework by operational guides	Needs assessment; development of guidelines; consultations with operations staff	MENR, MOH, MAFI, ME, DOC, AS	2004-2006	Proposal	150,000	International donors, GRM
Capacity Building							
5. Increase capacity for better management of prohibited pesticides	Upgrade the capacity of local authorities for safe and environmentally sound management of stockpiles	Design training curricula, training courses for 32 districts' and villages' authorities (to be repeated every 2 years), supply equipment	MENR, MOH, MAFI	2004, 2006, 2008 (to be repeated every 2 years)	Proposal	60,000	GRM
	Facilitate implementation of repackaging and transportation in an environmentally sound manner	Preparation of environmental operational handbook for repackaging and transportation	MENR, MAFI, MOH, MOD, DES	2004-2005	Proposal	30,000	GRM
	Train MOD and DES for environmentally safe and efficient repackaging and transportation	Design training curricula, training of trainers, training of MOD and DES staff	MOD, DES	2004-2005	Proposal	35,000	GRM

Problem Area	Objectives	Proposed Action	Lead and Implementing Agencies	Timeframe	Status	Cost,* US$	Potential Sources of Financing
	Improve planning and co-ordination of repackaging and transportation procedures at district level	Implementation of rapid feasibility study for 32 districts, preparation of 32 District Repackaging Plans, consultations with stakeholders and local authorities	MOD, DES, MENR, MAFI, MOH, local authorities	2005	Under preparation by NATO	100,000	GRM, international donors, Ecological Fund
	Evaluate environmental, social and economic impacts of repackaging and transportation activities	Conducting an Environmental Impact Assessment at national scale and in one typical district (as a pilot activity)	MENR, MOH, MAFI2005	Proposal	75K-100K, including technical assistance	International donors, GRM	
6. Increase capacity of energy sector for PCBs identification in power equipment	Familiarize technical and managerial staff with sampling, identification and labeling procedures, and reporting requirements	Preparation of the training manual, specification of sampling/analytical kits, training courses for all energy enterprises, preparation of a practical handbook (PCBs identification, labeling, equipment hot-spot assessment and safety management, reporting), consultation with stakeholders	ME, all energy enterprises, major energy consumers	2005-2006	Proposal	100,000	International donors, GRM, energy enterprises
	Increase preparedness for PCBs identification	Preparation and coordination of reconnaissance inventory plans for all energy enterprises, purchasing and distribution of sampling/analytical kits	ME, all energy enterprises, major energy consumers	2005	Proposal	30,000	International donors, GRM, energy enterprises
7. Inventory of PCBs in electrical power equipment	Identify PCBs presence in power equipment	Sampling and assessment of PCBs presence on-site (by simplified kits), labeling, hot-spot (risk) assessment, reporting	ME, all energy enterprises	2005-2006	Proposal	150,000	Energy enterprises, GRM, international donors
	Identify PCBs concentration in power equipment	Planning, sampling, analysis (laboratory control), reporting	ME, all energy enterprises	2005-2007	Proposal	costs will depend on the results of reconnaissance inventory	Energy enterprises, GRM
8. Widening of PCBs inventory to other than energy sectors	Increase the knowledge about PCBs concerns at national scale	Preparation of check-lists and instructions for self-identification of PCBs in equipment, products, articles; familiarization of a wide spectrum of agencies with inventory needs; analysis of responses; preparation of a national screening plan for further hot-spot detailed assessment	MENR, MOI, MOH, MAFI, AS	2006-2007	Proposal	100,000	GRM, international donors

Problem Area	Objectives	Proposed Action	Lead and Implementing Agencies	Timeframe	Status	Cost,* US$	Potential Sources of Financing
9. Increasing of POPs monitoring national capacities	Tailor POPs monitoring at national scale	Formulate monitoring strategies tailored for different groups of POPs, sources and media; design monitoring programs and sampling requirements; define laboratories' responsibilities, create a platform for data exchange.	MENR, MOH, MAFI, ME, AS	2005-2006	Proposal	150,000	International donors, GRM
	Upgrade instrumentation of laboratories for POPs monitoring	Identification of laboratories' needs, specification and purchasing of equipment, supplies, reagents and standards, setting QA/QC procedures and training the staff	MENR, MOH	2005-2009	Proposal	700,000	International donors, GRM
10. Capacity building for unintended POPs	Increase knowledge about unintended POPs sources at national scale	Preparation of questionnaire, analysis of replies, estimation of emissions, risk evaluation, sources prioritization	MENR, AS	2005-2006	Proposal	50,000	GRM, international donors
	Investigate the extent of pollution by unintended POPs in a pilot (priority) area	Selection of a pilot area and design of the sampling program, sampling and analysis (in EU laboratory), interpretation of results and formulating recommendations	MENR	2006	Proposal	100,000	International donors, GRM
11. BAT and BEP knowledge transfer	Increase the knowledge in using BAT and BEP technology for POPs management and formulate affordable options for Moldova	Formulate courses curricula, implement seminars, study tour, formulate and discuss options for Moldova	MENR, AS and other partners	2006	Proposal	100,000	International donors
12. Developing an action plan addressing the issue of unintended POPs	Identify, characterize and address the release of unintended POPs and facilitate implementation of practical measures that can achieve a significant level of release reduction and source elimination	Develop strategies for reduction of unintended POPs releases and promotion of BAT and BEP technologies	MENR, MOI	2005-2006	Proposal	50,000	GRM, international donors
13. Increasing preparedness for contaminated sites management	Develop appropriate tools for identification of contaminated sites	Preparation of methodology for risk assessment, formulation of contaminated sites criteria, consultations with stakeholders	MENR, MOH, AS, MAFI, ME	2005	Proposal	100,000	International donors, GRM
	Preliminary mapping of contaminated sites	Preparation of contaminated sites assessment plan; collection of relevant information; consultations with local authorities, population, businesses; description/mapping of sites identified; incipient analytical works	MENR, MOH, MAFI, ME, local authorities	2005-2007	Proposal	150,000	GRM, international donors, local authorities

Problem Area	Objectives	Proposed Action	Lead and Implementing Agencies	Timeframe	Status	Cost,* US$	Potential Sources of Financing
	Know-how transfer of low-cost remediation options for contaminated sites	Preparation of know-how transfer program, conducting of seminars, study tour, low-cost remediation measures development	MENR, MOH, MAFI, ME	2005-2007	Proposal	100,000	International donors
14. Promotion of research and development	Increase awareness and stimulate the scientific community in needs oriented research and development; facilitate cooperation schemes	Organize international/regional conferences, include POPs research in GRM programs	AS, MENR	2004-2009	Proposa	100,000	International donors, GRM
		Development of non-pollution technologies	AS, MENR	2005-2009		200,000	
	Investigation and quantification of POPs impacts on the environment and public health	Determination of POPs concentrations in environment compartments, including migration and transformation. Epidemiological studies on vulnerable and exposed population groups	MH, MENR	2006-2009	Proposal	250,000	GRM, Ecological Fund
Remediation measures							
15. Repackaging and centralization of obsolete pesticides	Provision of UN accepted packaging materials, protection clothes, equipment, express analytical kits	Detailed needs assessment, specification, purchasing, delivery	MAFI, MOD, DES, MOH, MENR	2004-2006	implemented by MAFI (financed by GRM and the Ecological Fund)	To be determined after RFS (task 5)	International donors, GRM, Ecological Fund
	Preparation of district deposits for concentration of obsolete pesticides	Selection of district deposits, preparation of rehabilitation plans, approval of selected district deposits by environmental and health authorities, small rehabilitation, commissioning	Local (district) authorities, MENR, MOH, MAFI	2004-2005	Partly implemented	Can not be determined before rehabilita-tion plans are prepared	GRM, Ecological Fund
	Implement repackaging and centralization of pesticides in an environmentally sound manner	Repackaging and centralization of obsolete dry and liquid pesticides, and contaminated packaging materials at 32 districts deposits	MOD, DES, MENR, MOH, MAFI	2004-2006	Partly implemented by MOD and DES	Can not be determined before RFS (task 5)	GRM, international donors
16. Low-cost, community based urgent actions for abandoned deposits	Reduce impacts to humans and local environment	Preparation of low-cost urgent remediation plans for the abandoned pesticides deposits, approval and coordination of plans, fencing, safety/precaution symbols installation, blocking of doors and windows	Local authorities, MOH, MENR, MAFI	2004-2006	Proposal	Can not be determined before remediation plans are prepared	Local, GRM, Ecological Fund

Problem Area	Objectives	Proposed Action	Lead and Implementing Agencies	Timeframe	Status	Cost,* US$	Potential Sources of Financing
	Implement incentive mechanisms so that 32 rural communities are ready to implement other chemical safety projects	Selection of the "best" rural community per district, preparation of grant proposals	MENR	2005-2006	Proposal	25,000 for implementation of village competition, total grant amount is 75,000	GRM, Ecological Fund
17. Remove old DDT stocks from households	Collect old persistent pesticides (including DDT) stored in the private households, and transport them to the district deposits	Selection of implementation agency, training and provision of equipment for selected implementation agency, negotiations with commercial companies, activities at village level	MAFI, local authorities	2005-2009	Proposal	200,000, including training, equipment, site visits	International donors, Ecological Fund, GRM
18. Assessment of final solution for obsolete pesticides and abandoned stockpiles	Finalize assessment and investment project preparation for the final solution regarding obsolete pesticides stockpiles	Feasibility study, investment project preparation, negotiations with donors	MENR, MOH, MAFI	2005-2006	Proposal	150,000	International donors, GRM
	Finalize assessment and investment project preparation for the final solution regarding abandoned and out-of-use deposits (buildings, ruins)	Feasibility study, investment project preparation, negotiations with donors	MOH, MENR, Local authorities, MOH	2005-2006	Proposal	150,000	International donors, GRM
19. Remediation of Cismichioi pesticide dump	Ensure safe storage of dumped pesticides	Fencing of territory, renovation of drainage and run-off collection systems, covering of the site with a new protection layer, routine monitoring of soil and water	MAFI, AS, MENR, MOH, Local authorities	2005-2009	Proposal	To be determined after additional investigation	International donors, GRM, Local
20. (option1) Feasibility study for Vulcanesti stock of out-of-use capacitors	Finalize assessment and investment project preparation for the final solution regarding out-of-use capacitors remediation measures	Feasibility study, investment project preparation, negotiations with donors	MOE, MENR, MOH	2004-2006	Proposal	150,000	International donors, GRM
20. (option 2) Remediation measures for Vulcanesti stock of out-of-use capacitors	Ensure environmentally sound remediation of out-of-use electrical capacitors	Hiring of a foreign company for full elimination of electrical capacitors shipping abroad	ME	2005-2006	Proposal	1200,000	International donors, GRM

Problem Area	Objectives	Proposed Action	Lead and Implementing Agencies	Timeframe	Status	Cost,* US$	Potential Sources of Financing
21. Country-wide handling of PCB-contaminated and damaged equipment	Ensure environmentally sound remediation of PCB-contaminated, damaged, leaking and risky power equipment	Centralization of abandoned equipment, provision of safety containers, identification of technology for PCBs and PCB-contaminated equipment elimination	MOE, MENR, MOH	2005-2008	Proposal	Can not be determined at this moment	International donors, GRM
Public awareness, training and education							
22. Improvement of communication	Ensure effective communication on POPs related issues and provision of communication knowledge and skills for decision makers, professionals and public	10 short-term courses per year, manual, establishment of a communication framework, adaptation of existing communication channels for POPs issues, development of communication procedures	MENR, REC, NGO	2005-2009	Proposal	100,000	International donors, GRM, Ecological fund
23. Building up participatory process	POPs participatory process is effective	2 interdisciplinary meetings/ forums per year, 5 group meetings and seminars on exposure risks per year, development of processes and procedures for participatory solution of POPs problems	MENR, REC, NGO	2005-2009	Proposal	600,000	International donors, GRM, Ecological fund
24. Exchange of information at country and international levels	National society is aware about POPs issues, risks, consequences and mitigation measures required	Development and dissemination of POPs- related information in mass media and accessible publications, including visual publicity (at least 10 events per year), one interactive dialog per year, one POPs caravan per year, preparation of one agricultural and industrial non-POPs „oasis" for demonstration each year, participation at international forums	MENR, REC, MOH, ME, NGO, AS	2005-2009	Proposal	300,000	International donors, GRM, Ecological fund
25. Training of general public	Wide range of POPs players are trained in environmental sound management and chemical safety issues	Organizing 5 training seminars per year for various target groups, one Olympiad for different age groups in POPs alternatives every year, development and introduction of training packages in POPs for current and future (students) public servants, family doctors, business managers and developers	MENR, REC, MOH, NGO	2005-2009	Proposal	150,000	International donors, GRM, Ecological fund
26. Education	Education programs include POPs issues and chemical safety elements	Development and dissemination of educational packages for specific groups (local and central authorities, pupils, students, vulnerable groups, etc.)	Ministry of Education, MENR, NGO	2005-2009	Proposal	150,000	International donors, GRM Ecological Fund
Note: The co-financing or contribution of the Government, National Ecological Fund or other internal sources will be indicated during the development or negotiation of the projects							

* The costs were estimated within the WB/GEF Project. This column was excluded from the final version of the document, approved by the Government.

7. IMPLEMENTATION, EVALUATION AND UPDATING

The NIP is an operational document providing a framework for the implementation of the Stockholm Convention in Moldova. The current NIP is only a first step in meeting the obligations arising from the Stockholm Convention and is oriented mainly to the short-term current POPs priorities, covering a five-year implementation period. The NIP implementation is based on the following.

The NIP has been developed through an extensive stakeholder consultation process and passed all national co-ordination procedures. Involving all stakeholders in NIP implementation is one of the pre-conditions for obtaining the expected results. Clear sharing of responsibilities and tasks is a key element of the NIP implementation, and this will call for a close inter-ministerial and inter-sectoral coordination and cooperation.

The overall operational coordination of NIP implementation will be the responsibility of the MENR. The supervision and evaluation of the NIP implementation will be effected by the National Committee for Environmental Policy, which will decide on its revision or updating, if necessary. The Committee will ensure an effective and efficient inter-ministerial coordination and cooperation and will promote the incorporation of the NIP requirements into other national strategies, policies and plans.

The MENR will create the Center for Chemicals Management (CCM), thus bringing various related international Conventions' focal points under one umbrella. The CCM will act as the executive body to deal with day-to-day activities in this field and coordinate and manage Moldovan international obligations under the Basel, Stockholm, LRTAP and Aarhus Protocol (and potentially Rotterdam Convention), thus gaining synergies and improving and increasing efficiency, cost-effectiveness, transparency, accountability and cross-fertilization.

The NIP will complement on-going national activities in this area, specifically activities conducted by the MENR, MAFI, MOD and DES for the collecting and safe storage of obsolete pesticides, as well as the MOE activities on PCBs detailed inventory and safe storage. It will build synergy with other IDA projects, and particularly with Rural Investment and Services Project 2, whichwill focus also on improved pest management for crops; and Energy II project, which includes several activities with regard to identification and safe storage of PCBs in energy sector. The NIP might also be linked with the World Bank-supported Moldova Trade and Customs project, particularly in supporting development of DOC capabilities related to monitor POPs import/export, transportation, identification and reporting activities.

Some of NIP actions will be very costly. Adequate support from national and international sources is therefore a crucial pre-condition for successful NIP implementation, for both technical assistance and investments.

The GRM seeks technical assistance in the following areas:

- Improvement, increasing coherence and harmonization of national and international POPs-related legal framework, and designing of innovative financial mechanisms (e.g. "debt-for-nature-swaps," HIPC[25], etc.);
- Support for implementing the NIP, evaluating and reporting on the NIP and related Conventions and Protocols progress, and coordinating with relevant MFI and bilaterally financed projects;
- Establishment of a national information system (a database of comprehensive, accurate and regularly updated aggregated information on POPs, similar to OECD "Pollutant Release and Transfer Register"[26]), and increasing capacity of CCM for data management and presentation.

[25] World Bank-IMF Heavily Indebted Poor Countries Debt Initiative (Moldova is also eligible to borrow from IMF under the Poverty Reduction and Growth Facility.)

[26] On May 21, 2003 Moldova signed the Protocol on Pollutant Release and Transfer Registers to the 1998 Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, ratified by Moldova on August 9, 1999.

- Strengthening environmental and health monitoring, including analytical and reporting capabilities.
- Support to the energy sector in PCBs identification in power equipment and further PCBs elimination measures.
- Training of professional staff.
- Support in identification, management and remediation of contaminated sites.
- Feasibility studies for planned on-ground measures.
- Designing and implementing public training and awareness programs, based on the "community-right-to-know and participate".

International financial support for implementation of on-ground remediation measures will be needed for:

- Providing of UN-accepted repackaging materials for obsolete pesticides.
- Precaution and rehabilitation measures for Ciºmichioi pesticides dump;
- Elimination of obsolete pesticides;
- Elimination of PCB oils, PCB-contaminated equipment (e.g. capacitors) and wastes;
- Contaminated sites remediation.

GRM launched discussions with IFIs and bilateral donors (GEF, France, Sweden, UK, USA, Denmark, Turkey, EU, NATO, etc.) regarding investment and technical assistance.

Evaluation of implementation progress is an important component of the NIP. In will allow for assessing whether and to what extent the NIP objectives are being met and what are the NIP components in need of updating. Performance evaluation will be done in a transparent way, through a participatory process, involving all stakeholders. Their results will be made available to the general public.

The NIP includes a set of evaluation criteria allowing the assessment of the implementation progress, efficiency and problems. The MENR will be responsible for collecting relevant information, evaluating the performance indicators, assessing the implementation needs, progress and troubles. The MENR will periodically report on its findings to the Conference of Pariecs and the National Committee on Environmental Policy. Reporting procedures should be developed and all involved parties should be trained accordingly.

Ministries and other state bodies will be responsible for NIP monitoring and evaluation within their sectors. The results shall be part of the decision-making process. Local authorities will have monitoring and evaluation responsibilities in the areas of their jurisdiction. The implementation units of the individual projects will be responsible for their monitoring and for reporting.

▲ Each barrel with obsolete pesticides must be inventoried.

The goal of evaluation indicators is to assess how NIP activities effect the direction of change in environmental quality and to measure the magnitude of that change. While most NIP indicators will allow quantitative evaluation of the implementation process and impacts of various activities, many indicators will seek to measure qualitative aspects, e.g., monitoring of the evolution of public attitudes towards POPs problems being addressed through opinion polls and surveys. Furthermore, as the NIP seek to address many institutional issues, which are as much about quality as they are about quantity, both numerical indicators and qualitative assessment will be employed. The range of verifiable indicators of the NIP implementation may include, but not necessarily be limited to, the following:

- National legal and regulatory framework amended to meet requirements of the Stockholm Convention;
- Specific guidelines/handbooks supporting legal and regulatory framework developed;
- POPs information system established and fully operational;
- PRTR established;
- No. of trained specialists;
- Amount (% from total) of obsolete pesticides repacked and transported to new storage places;

▲ Short-term actions will be focused on “Moldelectrica” stations.

- No. (% from total) of conserved old pesticides depots awaiting decontamination;
- Amount of obsolete pesticides collected from private households;
- Cismichioi pesticide dump remediation measures implemented;
- No. (% from total) of energy equipment checked for PCBs content and labeled;

▲ Safe storage of capacitors will prevent releases.

- No. of compliance checks by SEI at energy enterprises;
- Elimination of old capacitors from the Vulcanesti electric station implemented;
- No. (% from total) of out-of-use capacitors stored under controlled conditions;
- No. of sites investigated for POPs contamination;
- No. of public awareness, information and education activities;
- No. of environmental samples for POPs analysis;
- No. of epidemiological studies undertaken;
- No. of organizations participating in information exchange and reporting.

The verification of indicators will be done through assessment of reports provided by the MENR. The evaluation results: (i) will provide for updating the NIP, as well as chemical safety policies and strategies; and (ii) will bring more transparency into policy development in this field. They will be disseminated to the public authorities (at various levels), private sector, external donors, mass media and the general public. This will be done through the annual State of the Environment Reports and the MENR website.

It has to be stated that the NIP is not a rigid document and will be subject to revisions and updating on regular basis, e.g. every 5 years. Obviously, this will be linked to the performance evaluation process. The main responsibility for NIP performance evaluation and updating lies with the National Committee on Environmental Policy and MENR.

ANNEXES

Annex 1: Legal, Regulatory and Institutional Activities

These include actions for the modernisation of current legislation specifically related to the Stockholm Convention and incorporation of provisions for establishing a broader chemical safety approach in the country. It also includes the drafting of specific regulatory acts and the supporting of operational guidelines/handbooks for practical application. The important element is the creation of adequate institutional arrangements for the co-ordination of POPs related activities country-wide, and further dissemination of the experience gained for overall chemical safety aspects.

TASK 1. Modification of legal framework

- The national legislation should contain legal provisions for the administration of the chemical safety management system in Moldova, clearly define responsibilities, specifically prohibit production and use of POPs chemicals and regulate their export/import, as well as provide a legal basis for reduction/elimination of releases from unintentional production. The legal provisions should also cover POPs contaminated site management issues, define responsibility for POPs contaminated sites, incorporate POPs monitoring and reporting, regulate assessment of new chemicals meeting POPs criteria, promote BAT and BEP for new and existing sources, as well as requirements for modified materials, products and processes. The objective is to provide a legal basis for POPs chemical management under the Stockholm Convention requirements and to set up an overall chemical safety system in Moldova. The leading agency is MENR, which should work closely with other stakeholders (MOH, MAFI, MOE, DOC, etc.). The experts should revise existing legal acts, identify relevant gaps and propose modification of legal doc-

▲ Legal provosions will define responsability for POPs contaminated sites.

▲ Developed Guidelines will cover remediation measures for the destroyed warehouses.

uments accordingly. The results should be discussed with the stakeholders and relevant amendments should be agreed. The planned duration of the project is 12 months.

TASK 2. Administration set-up

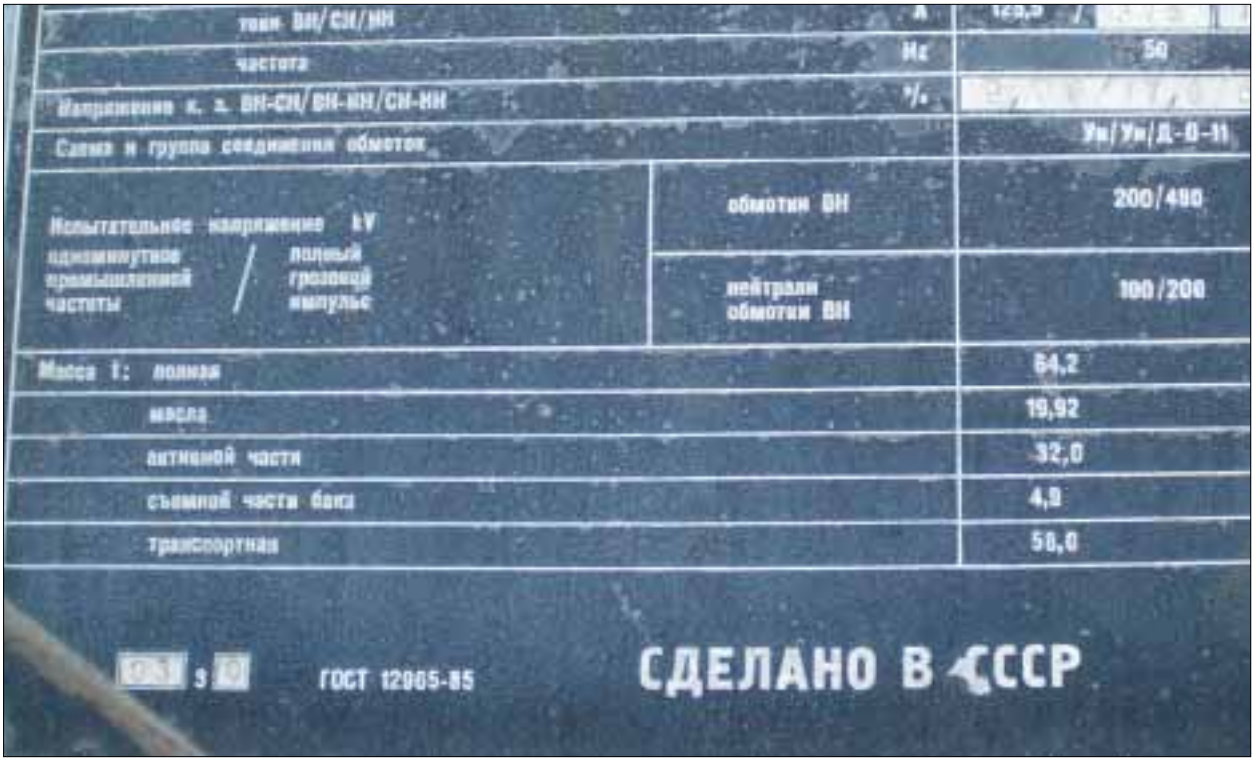
- The administration system should create the platform for high political commitment, further chemical safety policy development, better management of chemical safety issues and coordination of POPs related activities, evaluation of results obtained, fine-tuning of Action Plan, and reporting, as well as for further planning of measures required by the Stockholm Convention. The implementation of the Stockholm Convention requirements will be coordinated by the National Committee for Environmental Policy, created in July 2002, which brings together senior officials from the key ministries.
- To support activities of the National Committee for Environmental Policy in the field of chemical safety, the GRM and MENR will consider to bring various related international Conventions' focal points under one umbrella, transforming the existing POPs PIU into a separate legal entity (Center for Chemicals Management - CCM), in order to coordinate and manage Moldovan international obligations under the Basel, Stockholm, LRTAP and Aarhus Protocol (and potentially the Rotterdam Convention). This will gain synergies and improve and increase efficiency, cost-effectiveness, transparency, accountability and cross-fertilization. The proposed CCM should take management responsibility for implementing ongoing programs and assume day-to-day responsibility for implementing the POPs NIP. The capacity of the CCM should be greatly enhanced, if it is assisted, during the first few years, by an international environmental consulting company with relevant expertise.
- To be effective in management issues, the CCM should be supported by a relevant information system. The objective is to create a central information unit for POPs chemicals, to be further enlarged for other chemical safety issues. It is required to (i) design the information system, including database and GIS applications, (ii) install required hardware and software and train the staff for operation, and (iii) test the information system performance.
- Establishing a national reporting framework and procedures will first require the amendment of relevant legislation. Then an Instruction for POPs Statistical and Informational Reports should be created to transfer the legal provisions into a more practical document. A set of specific reporting sheets and formats should be prepared. The sources of information should be identified and delivery formats should be pro-

posed. The responsible agency is CCM, in association with other interested parties. The CCM should be the key recipient of statistical data and should be capable to process and evaluate the data obtained, and to maintain the information system. The to-be-created informational system would serve as a basis for setting-up the Pollution Releases and Transfer Register. The GRM will ensure that annual statistical data from relevant agencies (MAFI, DOC, etc), are furnished to the CCM on a regular basis.

TASK 3. Development of regulatory mechanisms

- The new legal provisions should be sustained by specific regulations. The objective is to transfer the POPs related legal provisions into practical and management tools. Regulations should cover at least the following issues: (1) management of district storage facilities for obsolete pesticides and wastes; (2) management of abandoned storehouses and contaminated sites; (3) import/export and transboundary transportation of obsolete pesticides and PCBs; (4) procedures for assessment of new pesticides and pesticides currently in use against POPs criteria; (5) regulation on statistical reporting on POPs pesticides and PCBs wastes, products, installations and PCB-contaminated sites; (6) instruction for management of PCB-contaminated power equipment; (7) recommendations for safe usage of PCBs materials; (8) instruction

▲ Leakages of oil from the transformer



▲ Most of the out-of-use transformers were produced in the ex-USSR

for field and laboratory identification of PCBs content in dielectric oils and other materials; (9) guide on performing PCBs inventory and hot spot identification; (10) instruction for transportation of oils, equipment and other PCB-contaminated materials; (11) instruction for disposal of PCB-contaminated oils and PCB-contaminated power equipment; (12) instruction for retrofilling the power equipment; (13) instruction for labelling PCB-containing equipment; (14) regulation on POPs management control. The leading implementation agency is MENR, in partnership with MOE, MAFI, DOC, MOH. Experts in environmental sciences, chemistry, health, risk assessment and legislation will draft relevant regulations and discuss findings with stakeholders. The duration of the project is 2-3 years and should be phased in, starting with priority regulations needs.

TASK 4: Drafting of practical guidelines and handbooks for POPs chemicals management

- The improved legal framework will provide the general frame for POPs management in Moldova, and regulations will establish relevant rules and procedures. To be efficient, the legal acts and regulations should be clearly understood by the involved parties and should be supported by relevant operational and methodological guides. Several operational handbooks and guidelines are to be produced, describing methods, management options and operational aspects in relevant areas of the POPs chemical management. The activity is foreseen for the next 2-3 years, after completion of legal and regulatory amendments. The needs for specific guidelines and handbooks would be assessed and a detailed plan would be prepared. The responsible agency is MENR in close co-operation with relevant parties.

Annex 2: Capacity Building

It includes prioritised actions related to training of professionals and decision makers, widening and deepening of inventories for POPs chemicals, hotspot identification, reporting, capacity building elements for monitoring and control, further studies and methodology development.

TASK 5. Increasing national capacity for better management of prohibited pesticides, including POPs

- The managerial capacity of local authorities should be upgraded. For this purposes country-wide training should be organised for district and local rural authorities regarding safe and efficient management of obsolete pesticides stockpiles. Training will involve primarily authorities from the settlements where temporary storage of obsolete pesticides is foreseen. Training curricula should include stockpiles management options, related risks and their minimisation, building relations with the local public, reporting and other issues. Training should be organised under the MENR umbrella. The activity may take 4 months, including the preparation phase, and should be repeated every 2 years.
- The MOD and DES are responsible for the repackaging and concentration of obsolete pesticides at the selected district deposits. To improve their capabilities to implement these tasks in an environmentally sound and safe manner, a specific operational handbook describing all required procedures (planning, preliminary assessment of storage facilities, preparation of re-packaging/transportation schedule, preparing of MOD and DES staff for field works, procedures for express identification of unknown substances, labelling, packaging instructions, loading, transportation and re-loading procedures, registration, log-booking and work commissioning) should be produced by a team of national experts. The leading agency is MENR, with partners from MOD, DES, MAFI and MOH. This activity is a top priority, as MOD and DES already started re-packaging in a few districts. The duration of the project is 1-2 months. International expertise may be required in the final stage to revise the handbook for ensuring that all internationally accepted safety and environmental protection elements are incorporated.
- After drafting the handbook, training of MOD and DES staff will be required, in order to ensure that all operation elements are in place, staff is prepared and understands all requirements. The training should include also a "training of trainers" component, so that MOD and DES officers may replicate training courses with new recruits if necessary. The leading agencies are MOD and DES. The total duration

▲ PCBs identification in transformers – a task at national scale.

of training courses is about 1 month, including preparation of training materials.

- In parallel with the above mentioned projects, a Rapid Feasibility Study for each district is urgently needed. The study should be finalised by the preparation of a District Re-packaging Plan, which includes following elements: sharing of responsibilities between parties involved, timetable for re-packaging and order of transportation, assessment of needs for packaging material, personal protection equipment, express analytical kits, etc. The responsible agency is MOD, in co-ordination with DES, MENR, MAFI and MOH. Activities can be financed from the NATO project, which is currently in the pre-feasibility phase. The total duration is 3 months.
- In parallel with the Rapid Feasibility Study, the Environmental Impact Assessment for repackaging and centralising of obsolete pesticides should be started. Two inter-related documents will have to be produced. The first one should treat the process of repackaging and centralising at national scale and should mainly follow the methodology for Strategic Environmental Assessment. The second document should be produced in more detail (as a demonstration for one typical district). It should follow the methodology of full Environmental Impact and Risk Assessment. Both documents should consider different alternatives in respect to their environment, health, social and economic impacts. The total duration is 3 months. The responsible ministry is MENR, with assistance from MOH and MAFI. International expertise is highly required, as well as external financial support. It will be an advantage if the RFS and EIA projects will be linked under the NATO umbrella.

TASK 6. Increasing the national capacity of the energy sector for identification of PCBs in equipment

- The training for the energy sector on PCBs identification in power equipment has to be implemented at national scale. The responsible agency is MOE. The objective is to train managerial and technical staff from all energy enterprises (private and public) in uniform sampling and analytical procedures, registration of data, labelling, hot spot identification and reporting. The duration of the activity is 4 months. Technical assistance will be sought for this activity. It should include: international and local expertise for the preparation of a training manual and the training schedule, identification and specification of sampling/analytical equipment affordable for Moldova (both for rapid reconnaissance and analytical PCBs identification), provision of

▲ Detailed inventory of PCBs in transformers.

sampling and simplified field kits for training purposes, practical training courses for different types of equipment (transformers, capacitors, circuit breakers, etc.), demonstration of labelling procedures and development of reporting sheets. One of the project outputs is to prepare and distribute among energy enterprises a practical handbook for first identification, labelling, equipment risk assessment, safety management of equipment in use and PCBs reporting in power equipment.

- The next step is the preparation of an inventory plan for each energy enterprise and the purchasing of the required number of sampling/analytical kits. All energy enterprises should prepare a plan for testing the inventory by simple analytical kits, indicating the time-schedule, the number of sampling points, the testing equipment needs, and the reporting schedule. The plans should be co-ordinated by the MOE. The MOE will be responsible for the purchasing of the required amount of sampling/analytical kits and its distribution to the energy enterprises. It will lead to a reduction of the unit price, uniformity of methods and better co-ordination of actions.

Each energy enterprise should allocate required funds for the preparation of the testing-plan and cover equipment-purchasing expenses. The duration is about 12 months.

TASK 7. Inventory of PCBs content in power equipment in the energy sector

- Following the new legal provisions and regulations and supported by practical handbooks, trained staff and delivered equipment, the responsible persons from each energy enterprise should implement a reconnaissance assessment (by simplified kits) of PCBs content in owned equipment, and label it accordingly. The costs of sampling, analytical determination, production and installation of required labels and reporting should be covered by electrical companies. Each electrical enterprise should report to the MOE on a yearly basis and submit updated plans for the next year. The report should also contain information on the risks identified for each installation, hot-spot assessment and description of safety management options applied or planned. The MOE should provide the data

to be introduced in the central POPs database. The total duration of the project can be 2 years.

- Having the preliminary information obtained after the first inventory phase, the electrical companies should carefully determine the PCBs concentrations by analytical methods. Each energy company should prepare a plan, including the time-frame, the identification of laboratory for analytical control, and the reporting schedule. The plan should be co-ordinated with the MOE, which has the overall responsibility for inventory. The costs should be covered by the electric enterprises. The costs and duration will entirely depend on the results of the first phase of PCBs assessment. The time necessary to accomplish the task may be roughly assessed at 2 years. The MOE should collect reports and ensure the supply of data to the central POPs database.

TASK 8. Widening the PCBs inventory to other economic sectors, products and articles

- A number of potential PCBs sources (out of the energy sector) should be inventoried for the purposes of PCBs identification under the leadership of MENR. The following actions are planned: (1) preparation of check-lists for PCBs source owners regarding self-identification of equipment, products and articles potentially containing PCBs. (2) preparation of a reporting outline for the description of the technical/management status of equipment, products and articles and associated potential risks for human health and environment, (3) distribution of check-lists and outlines for report to various enterprises and agencies with clear instructions, (4) analysis of responses and (5) preparation of a nation-wide screening plan for further implementation. The screening plan should pay special attention to the reported damaged and leaking equipment, presence of equipment in areas associated with food and feed production/processing and in populated areas (schools, hospitals). The project should be implemented by MENR during 2004-2008.

TASK 9. Increasing POPs monitoring capacity of environmental and health authorities

- The specific monitoring strategies should be tailored for POPs groups (as pesticides, PCBs, PCDD/PCDF), for different purposes (e.g., source, ambient and impacts monitoring) and for various media and components (water, soil, sediments, biota, agricultural and food production, and humans). The objective is to draft inter-related monitoring networks, define the sampling schedule and formulate responsibilities for national laboratories (SEI, MOH, Hydrometeorological Service) as well as create a platform for data management and exchange. The monitoring system should be tested (e.g., in pilot regions) and modified if required. The duration of activity is about 12 months.
- The laboratories of SEI, MOH and Hydrometeorological Service need upgrading of their instrumentation for POPs detection in different media. Besides, the SEI, as environmental enforcement agency, needs to be strengthened in view of PCBs controls in equipment. The objective is increasing the analytical capacities of three laboratories to fulfil country responsibilities and obligations under the Stockholm Convention. The Technical Assistance would include: identification of equipment needs, specification of instruments for sampling and analysis, provision of methodology, standards, supplies, setting up QA/QC procedures, as well as the training of staff. The leading agency is MENR, in coordination with MOH. The duration is estimated as 24 months.

TASK 10. Capacity building element for unintended POPs release sources

- A further widening of unintended POPs sources inventory would be required. The objective is to provide better understanding of current and projected releases of unintended POPs for particular sources under the following categories: power generation, heating facilities, waste incineration, and uncontrolled waste combustion. The responsible agency is MENR, which should prepare a questionnaire and distribute it among relevant enterprises, agencies and entities. On the basis of replies the current and projected emissions should be calculated, the risk preliminarily evaluated, priorities established and information introduced into the database and mapped. The time frame for the project is 6 months.
- A analytical investigation of PCDD/PCDF content in the priority environment compartments of Moldova is required for a better understanding of pollution treats and severity of the problem. The objective is to investigate the contamination of environment components (air, water, soil and wastes, in the vicinity of one or two priority sources. The duration of the project is 8-12

months. The responsible agency is MENR. International technical assistance is essential. An international expert, supported by local monitoring staff, should develop the monitoring strategy and design the sampling program. Local specialists have to be trained in sampling. Collected samples should be transported to a selected EU laboratory for analysis. A local laboratory manager and 1-2 specialists have to be trained at the EU laboratory premises. International financial assistance is necessary to cover project expenses.

TASK 11. BAT and BEP knowledge transfer

- Currently the knowledge on BAT and BEP is limited in the country, specifically at the level of businesses. The NIP is proposing to organise BAT and BEP knowledge transfer for a broad range of stakeholders and interested parties. The objective is to increase the knowledge of environmental authorities and industry in using BAT and BEP for POPs management. A number of specific courses for a range of local stakeholders should be implemented, associated with a study tour to a country having experience in this field. The responsible agency is MENR, with relevant partners. The planned duration of the project is 6-12 months. International assistance is the key to the project success. A foreign consultant company should be hired to organise the courses and the study tour, as well as to formulate BAT and BEP options for Moldova.

TASK 12. Developing an action plan addressing the issue of unintended POPs

- The objective of the project is to identify, characterize and address the release of unintended POPs and facilitate implementation of practical measures that can achieve a significant level of release reduction and source elimination. The results of the wider inventory of unintended POPs will allow the developing of strategies for reduction of their releases and the promotion of BAT and BEP technologies. The responsible agency is MENR, with assistance from MOI. The planned duration of the project is 12 months. International technical assistance is required.

TASK 13. Increasing country's preparedness for identification of contaminated sites

- The level of preparedness for managing the contaminated sites should be upgraded. Criteria for identification of contaminated sites should be developed and agreed by stakeholders. A methodology for risk assessment of contaminated sites should be prepared, including aspects of land use, access of population and animals to the site, spreading of pollution to other natural media, toxicity and environmental fate of different POPs. The duration of the project is 6 months. The responsible agency is MENR. International know-how and knowledge transfer is an important element for project implementation.
- Preliminary data collection regarding potential contaminated sites should be started, based on available information. The areas potentially contaminated by POPs are expected to include territories nearby pesticides storage facilities, places for pesticides solutions preparation, places where significant PCBs leakage had occurred, known places of POPs pesticides and PCBs operational failures, etc. A relevant information should be collected by the SEI in consultation with local authorities, population, and businesses, and should be presented on maps with site description. A limited number of analyses is foreseen as well. The general responsibility lies within the MENR.
- Currently, there is no experience in the country for wide application of remediation measures specified for POPs contaminated sites. As a first step to increase specific knowledge, the study of various options implicated in other countries is proposed. An international expert should prepare a review of available options and conduct basic training for local experts, decision makers and the public, and organise a study tour. As a result, low-cost mitigation measures, specifically designated for POPs pesticides, PCBs and dioxin/furans, should be developed with the participation of local experts. The duration of the project is 6 months under supervision from MENR. Funding from international sources is requested.

TASK 14. Promotion of research and development

Considering that the objective of research is to obtain scientific knowledge on POPs and their impacts in order to develop mitigation options, the NIP foresees promoting research and development efforts. The program of investigations will have to be targeted and phased, showing a high degree of flexibility, in order to be easily adapted as new data and information will be gathered.

- In the field of pesticides, research should be mainly focused on developing recommendations for total elimination of obsolete pesticides. This

is considered necessary in order to investigate cost-effective solutions for elimination considering at least the following options: (i) incineration, (ii) chemical destruction, (iii) natural long-term degradation under controlled conditions.

- PCDDs/PCDFs, HCB and PCBs research should focus on investigations of social and economic effects, evaluation of risk, environmental fate, ecotoxicological effects, study of transport and transfer processes, degradation mechanisms, bioaccumulation and biomagnification, destruction.
- Other major directions of POPs research in Moldova are: assessment of candidate chemicals under consideration for inclusion in the Convention; technologies for elimination/remediation of POPs in the environment; specific studies on the impact on population groups in heavily contaminated areas; studies to increase the understanding of POPs impacts on wildlife; and studies to explore social and economic implications of POPs and their alternatives.
- Future research in the framework of international cooperation on POPs may include: transboundary impacts of POPs and its significance; development of analytical methods for determining new types of POPs and their metabolites; study of emission, deposition, transformation and bioavailability of POPs in terrestrial ecosystems, soil, sediments, and ground water at regional scale; and environmental behaviour of POPs under various climatic conditions.
- The NIP foresees the organization of an international/regional research conference on "new aspects of POPs management in the countries of transition", seeking to support the creation of regional co-operation schemes for researchers and developers.

Annex 3: On-ground Remediation Measures

Most of the actions described under this chapter refer to the remediation of obsolete pesticides problems, as they are a recognised high priority. The actions include re-packaging and centralisation of obsolete pesticides at the district deposits as an intermediate solution, identification of a most appropriated final solution, low-cost measures to minimise impacts from abandoned storehouses, DDT specific actions at household level, and remediation measures for the pesticides dump in Cismichioi and stockpiles of out-of-use capacitors in Vulcanesti and other places.

TASK 15. Re-packaging and centralization of obsolete pesticides

- The procurement of UN-accepted packaging materials (bags and cans), individual protection clothes, equipment, small engineering tools and express analytical kits (for preliminary identification of unknown chemical substances in the field) should be started. The leading agency is MAFI, in co-ordination with MOD, DES, MENR, and MOH. An international expert, supported by local specialists, should identify the amount of items needed for the implementation of works at national level, prepare the specification and tendering documentation, evaluate proposals and monitor delivery. The total duration is about 8-10 months. Costs for materials and equipment may be determined only after the completion of a feasibility study. International financial support is highly and urgently needed. NATO may facilitate finding of financial support.
- At the same time, preparation of district storage facilities for centralising the obsolete pesticides should be started. On the basis of national safety standards, the district authorities should select an appropriate facility. Required costs for materials and civil works have to be estimated. The lead agency is MENR, which should provide consultation and advice to district authorities and supervise compliance with safety and environmental requirements, as well as the overall implementation. On the basis of prepared documentation, the district authorities should implement the repair works.
- Re-packaging and transportation of obsolete pesticides should be continued. The objective is to implement these actions in an environmentally safe manner. The responsible agencies are MOD and DES. Supervision of all works should be ensured by local representatives of MAFI, MENR and MOH. Together with the local authorities, they should sign the commissioning report. The reports should be presented to the MENR, and information should be introduced into the central POPs database. It is expected that re-packaging and concentration of obsolete pesticides will be finished during 3-4 years; the activity is highly depending from re-packaging materials delivery.

TASK 16. Low cost and community based urgent actions for reduction of impacts from abandoned storehouses

- Taking into consideration that re-packaging of obsolete pesticides and their centralisation may take 3-4 years, and that emptied old storage deposits may not be quickly decontaminated or remedied, the NIP proposes the local communities to implement urgent, but simple and low-cost actions for minimising pesticides releases and for the protection of local environment and public health. The low-cost urgent measures may include, but not necessarily be limited to, the following: (i) all facilities (or their ruins if it is the case), either if they still contain obsolete pesticides or not anymore, should be labeled with visible safety/precaution symbols, (ii) fences around facilities (or their ruins) should be built to limit access of population and grazing domestic animals, (iii) existing pesticides or their wastes should be covered with plastic, if deposit has a damaged roof, (iv) after the evacuation of old pesticides the windows and doors should be blocked by bricks. The responsibility falls on the local authorities, which should work closely with the MENR. The mayoralties should assess the current status of the facilities and prepare an implementation schedule and financial plan for low-cost measures. The plans should be agreed by the MENR. On the basis of the agreed plan the mayoralty should mobilise local resources and implement necessary actions. The local community should be involved in the discussion and implementation of measures.
- Incentives should be foreseen for the rural communities that have implemented the urgent low-cost measures in a safe and efficient way. It is proposed that at least one "best" rural community per district should be endowed by the Ecological Fund. The grant should be foreseen for the implementation of chemical safety related projects to be initiated by the community itself. The "best" community should be selected by a district commission, formed by representatives of local government, public, environmental, health authorities, and NGOs, on a competitive base with clearly stated criteria. The responsible agency is MENR.

TASK 17. Collecting old DDT stocks from households

- The objective is to persuade local villagers to return stored in the private households amounts of old pesticides, particularly DDT and other persistent chemicals. The MENR should select, on a competitive base, an agency (company or NGO), which will implement the activities. The agency should have agrochemical, health and environmental safety experience. The staff should be trained for safety management of pesticides, repackaging and transportation procedures and should be equipped with protective, packaging and other equipment, including transport. It will be an advantage if commercial companies, distributing in Moldova agricultural chemical or biological preparations for plant protection, would be able to contribute to the project by covering the operational expenses. Commercial companies may also propose to the farmers, in exchange to returned obsolete pesticides, an amount of their products with instructions for their safe utilisation. The GRM and MENR may allocate the necessary financial resources for purchasing the commercial products at a discount price, to be used as compensation for farmers. An intense awareness campaign should be part of the project. Local authorities will have a critical role for the success of this action.

▲ All obsolete pesticides stocks must be repackaged.

TASK 18. Assessment of final solution options for obsolete pesticides and abandoned storehouses

- The centralisation of obsolete pesticides at the district facilities is only an intermediary solution. Further, a final disposal/liquidation solution for obsolete pesticides, wastes and contaminated packing materials should be identified with a clear understanding of technical, economic, environmental and financial elements. The NIP proposes as a priority for the planned period to fulfil the assessment of available options, to estimate the potential environmental impacts, social and economic benefits, and consequently to select the most appropriate alternative(s). For the selected alternative(s) a feasibility study should be implemented. The responsible agency is MENR. The feasibility study may take about 12 months. International expertise and technical assistance is highly necessary.
- Abandoned and vacated storehouses (and their ruins) are sources of pollution and human health impacts, even if low-cost urgent measures will be implemented as described above. Several options exist for dealing with these facilities: they may be decontaminated and used for storing new chemicals, or for other purposes, or disassembled. The demolished materials may be used for other constructions, or construction materials may be treated as a toxic waste. The NIP states the need to study various alternatives and their impacts on the environment, health, social and economic life at national scale, prior to any further actions. The results and recommendations obtained will provide a sound base for final decision about out-of-use storehouses. The responsible agency is MENR. The study may be scheduled for 12 months. International expertise and external financing are required.

TASK 19. Remediation measures at the Cismichioi pesticide dump

- The last study, implemented under a Tacis project, indicated pollution of soils and shallow groundwater following the landscape gradient. In line with this, precaution measures are proposed such as: fencing the territory, renovating the drainage and runoff collection systems, covering the site with a new protection layer, environmental monitoring, annual inspection and maintenance, etc. All these recommendations should be implemented during 2004-2008. The responsible agency is MENR or MAFI.

TASK 20. Feasibility study for the Vulcanesti stock of out-of-use capacitors (option 1) or Remediation measures at the Vulcanesti stock of out-of-use capacitors (option 2)

- (option 1) A feasibility study and EIA are required for the Vulcanesti site hosting about 12,000 old capacitors. Feasibility study and EIA should include: (1) an assessment of the current

▲ Additional precaution measures will improve the safety of the pesticides landfill.

status of capacitors and of the management options applied, (2) the identification of current environmental and health impacts, (3) the elaboration of technical options for the elimination of capacitors, (4) an evaluation of related economic, social and environmental concerns. Clear environmentally sound alternatives to reduce releases from the Vulcanesti site should be formulated, and financial requirements should be identified. The responsible agency is MOE. The duration of the project is 12 months. International expertise and international financing is necessary.

- (option 2) The Vulcanesti site is hosting about 12,000 capacitors, which are out-of-use and leaking. It is proposed to hire an internationally accepted and experienced company, which will take the full responsibility for remediation measures, including the evacuation of capacitors from Moldova. The responsible agency is MOE. The activity may take about 1- 1.5 years. A rough estimate indicates the total elimination costs at US$ 1.0-1.2 million.

TASK 21. Country-wide handling of PCB-contaminated equipment

- Safe storage of capacitors and other out-of-use, contaminated or damaged equipment awaiting destruction is required. International financial support will be required for the centralisation of capacitors and other equipment identified as hot spots at the disposal place(s), provision of safety containers, and identification of technologies for PCBs and PCB-contaminated equipment elimination. Development of an effective monitoring system for temporary storage places would be of major importance. The owners of equipment should be prepared to purchase new PCB-free equipment. The cost for new equipment should be covered by the equipment owners. The total duration of the project is 1-2 years.

Annex 4: Public Awareness, Training and Education

This chapter responds to the most urgent needs to be met in the short to medium term in the following areas: raising public awareness on the dangers associated with POPs, training on POPs risks for most exposed (target) groups, as well as incorporation of POPs issues in the educational programmes.

TASK 22. Improvement of communication within Moldovan society on POPs related issues

- The improvement of communication within society is envisaged through the establishment of a communication framework, incorporating the following actions: provision of communication knowledge and skills to the staff of central and local public authorities, environmental and health protection agencies, NGOs, public com-

▲ Old capacitors at Vulcanesti station require urgent remediation measures.

panies, research institutes, universities. Establishment of mandatory institutionalized communication procedures between agencies and in relation to the public, providing of high quality communication equipment, creation of periodic informational releases, accessible to all groups, promotion of a socio-economic environment favourable for the personality empowerment and respect to people's opinion are the key elements of the actions required. The range of communication tools could include all communication techniques, starting with presentation and messages in mass media and general meetings of communities, interactive dialogues, micro-seminars between colleagues within and outside the profession, and ending with preparation and presentation of information through the existing communication channels of each community, such as professional meetings, entertainment facilities, local radio, children's networks, interest groups sessions, handicraft sittings, other accepted ceremonies and media. Provision of communication knowledge and skills could be carried out through a set of short term courses in communication with the population, offered to relevant agencies, organizations and institutions, including the Ecological Inspectorate, the public relations sections of relevant ministries, active ecological NGOs, representatives of the educational institutions with ecological or rural profile as well as selected representatives of the polluting companies. The training in communication of all these groups could be accomplished through short training courses. The course material could include the following areas: interpersonal communication skills, sharing of information between agencies, presentation of information to the public, general public relations, facilitation skills, relationships with mass media, preparation of accessible reports on activity. The course material could be accompanied by a short manual in communication in respect to POPs and other chemicals.

TASK 23. Building up a participatory process in respect to POPs and chemical safety issues

- The POPs related problems have better chance to get close to their successful resolution in the presence of a large-scale participatory process. The NIP preparation has already initiated steps for building up the participatory process, including: participatory framework for consultants, periodic events for exchange of opinions with relevant state institutions, NGOs, general public, accessing existing ecological networks for NGOs, creation of a Web site. The efforts of the MENR to maintain relationships with and to support ecological NGOs are also a significant step in building the participatory process. Further development of the participatory process for its institutionalisation as well as provision of skills in participation, maintaining of participatory processes and tools is planned. Review of the current responsibilities of the state agencies should be carried out, so that they would comprise regular affairs to the public, meetings with the concerned groups, open days, official presentations in mass media, maintenance of interactive tools for complaints and alerts. The objective could be achieved through the provision of training courses for the various groups relevant to POPs problems, including the state agencies, NGOs, educational institutes, business companies, consumers, women, children and least educated target groups.

TASK 24. Ensuring of information exchange at the country and international levels

- National exchange of information in POPs related issues is important both for the awareness-building process and for generation of new knowledge. The most important actions would be inter-sectoral and interdisciplinary meetings, meetings of different generations' representatives, access to and use of relevant networks, access to information about the state of the environment in each community and within the country as a whole. The main tool for the exchange of information would be a monthly or a quarterly POPs newsletter. Mixed age groups conferences and symposiums, regular conferences between the most relevant actors in the POPs process, such as: ecological inspectors, researchers, representatives of polluting companies, physicians, representatives of agencies responsible for the management of natural resources, etc would also serve the purpose. Local and national databases of POPs sources would be developed and made available to the public.
- At international level, information relevant to the solution of the POPs problem could be accessed internationally with other Parties to the Convention through bilateral and multilateral partnerships, creation of POPs networks, conferences, symposiums, contests, awards for alternatives to POPs, projects for solution of specific POPs related problems. The Republic of Moldo-

va could contribute internationally with POPs alternatives, BATs and BEPs generated through national exchange of information, participatory indicators for POPs developed by the research institutions and NGOs, demonstration of remediated sites and improved POPs decreasing solutions in agriculture and in protected areas.

- In order to build awareness in POPs related issues in the bulk of the population, the use of participatory forms of information dissemination is advised. The feedback tools are also important, due to the wealth of experience existing within the population in dealing with the chemicals, both in agriculture and industry. Other means could include agricultural and industry non-POPs "oases", built specifically for gaining experience in POPs substitution with alternatives and for the dissemination of such experience through demonstration. Such actions could be supplemented with lifestyles and activity patterns collected from different zones of Moldova, industry technology changes favourable to the environment, collections of best practices in POPs reduction, specific recommendations to representatives of different occupations, etc. The awareness-building tools with the greatest impact would include interactive programmes and dialogues in mass media, video spots and materials, POPs information caravans and excursions to more affected localities, national contests in POP reduction, visual publicity, such as stickers, leaflets, and posters. At local level, general meetings of localities dedicated to POPs topic, POPs reduction campaigns would also be of use.

TASK 25. Training in POPs for the target groups

- Training in POPs areas is needed for the representatives of all main target groups of occupations and professions relevant for POPs problems, and entities capable of disseminating information to a wider public, such as central and local public authorities, physicians, school and university teachers, kindergarten educators, administrative staff of industries, managers and trainers of NGOs and professional growth institutions, leaders of political parties, organizations for economic and social development, financial and banking structures etc. The training process could focus on civil servants most closely related to the POPs issues, representatives of the concerned NGOs and socio-economical factors. This first corps of POPs related information holders, having access to more detailed and more specific information than the one offered to the general public through information campaigns, could be treated as promoters of POPs related information and knowledge and encouraged to share it with the wider public. The training of these groups could include not only the whole range of information on POPs agents known as of the date of the training and their impact, but also practices and skills for the extension of POPs related information, references to additional information sources, participatory methods of data collection and transfer of information, skills for incorporating POPs related concerns into the decision-making process at respective levels. Small accessible POPs guides describing POPs sources in different occupations and in households, as well as the precautionary actions needed in their application, would serve as useful props for the training process.

TASK 26. Facilitation of education in POPs

- The education in POPs areas is significant not only through the need to pass the knowledge to the younger generation, but also through the moral obligation of the current generation to maximally contribute to the remediation of the damage done to the environment and to health of children and young people by the current and preceding generations. The education process needs predominantly a creative approach towards teaching methodology, involving case study, role play, brainstorming, teamwork. This educational framework could be supported through addressing the emotional dimension in cases suitable for the knowledge transfer. Along with a general overview of the POPs problem, the educational material could include a historical perspective, as well as a clear explanation of the real sources of POPs in the country, region and their own locality, and, importantly, project work and practical activity for reduction of POPs amounts and impacts on health and environment, excursions and other visualisation, inspection and reflection exercises on the best practices for POPs reduction and elimination. The young generation's creativeness could be employed though practical POP reduction activities under the guidance of relevant adults, such as ecological inspectors and competent teachers, which is also an effective educational tool. Children and students could research POPs alternatives, BATs and BEPs and contribute to their dissemination.

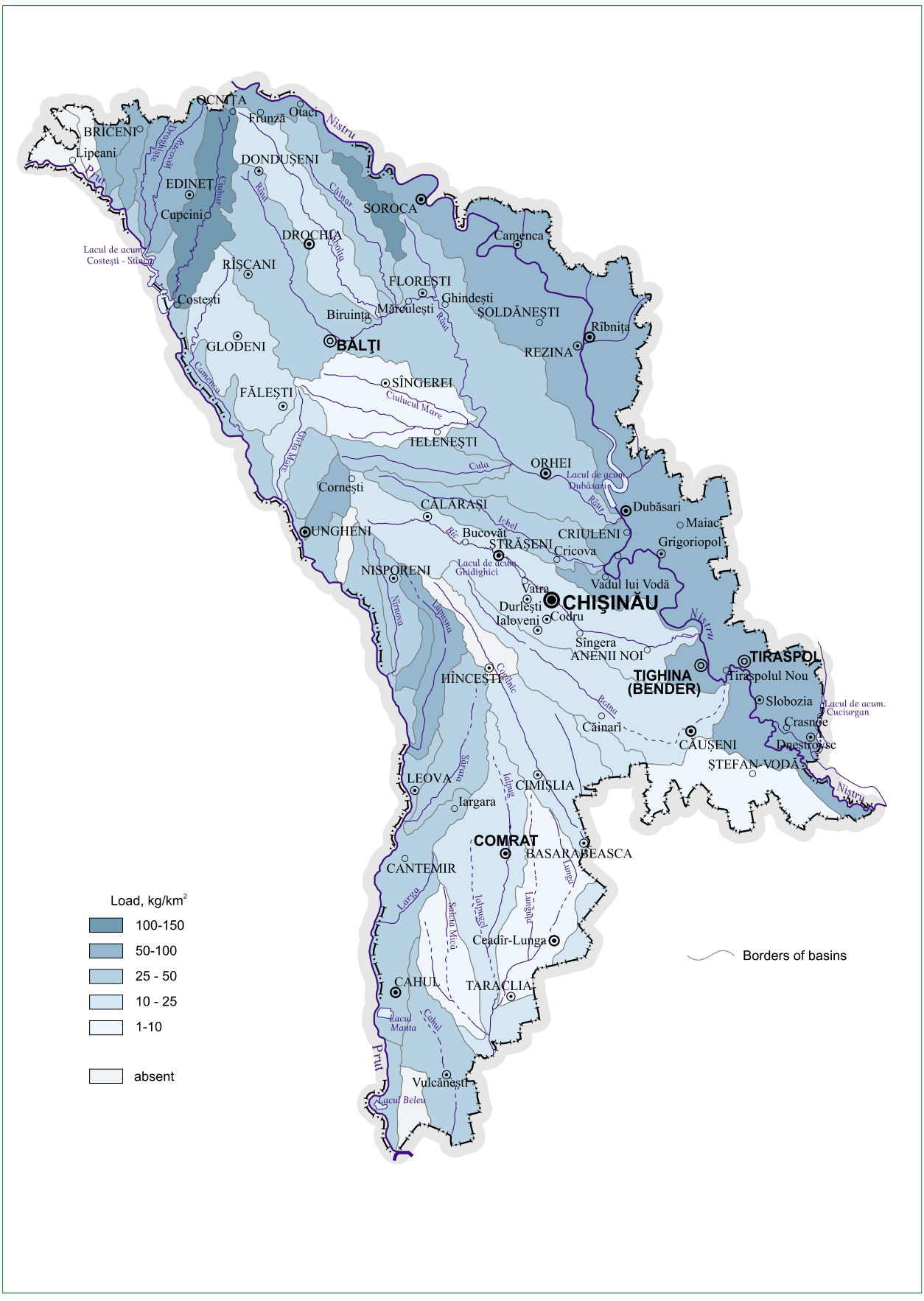


Figure 4. LOAD OF PERSISTENT ORGANIC POLLUTANTS ON RIVER BASINS

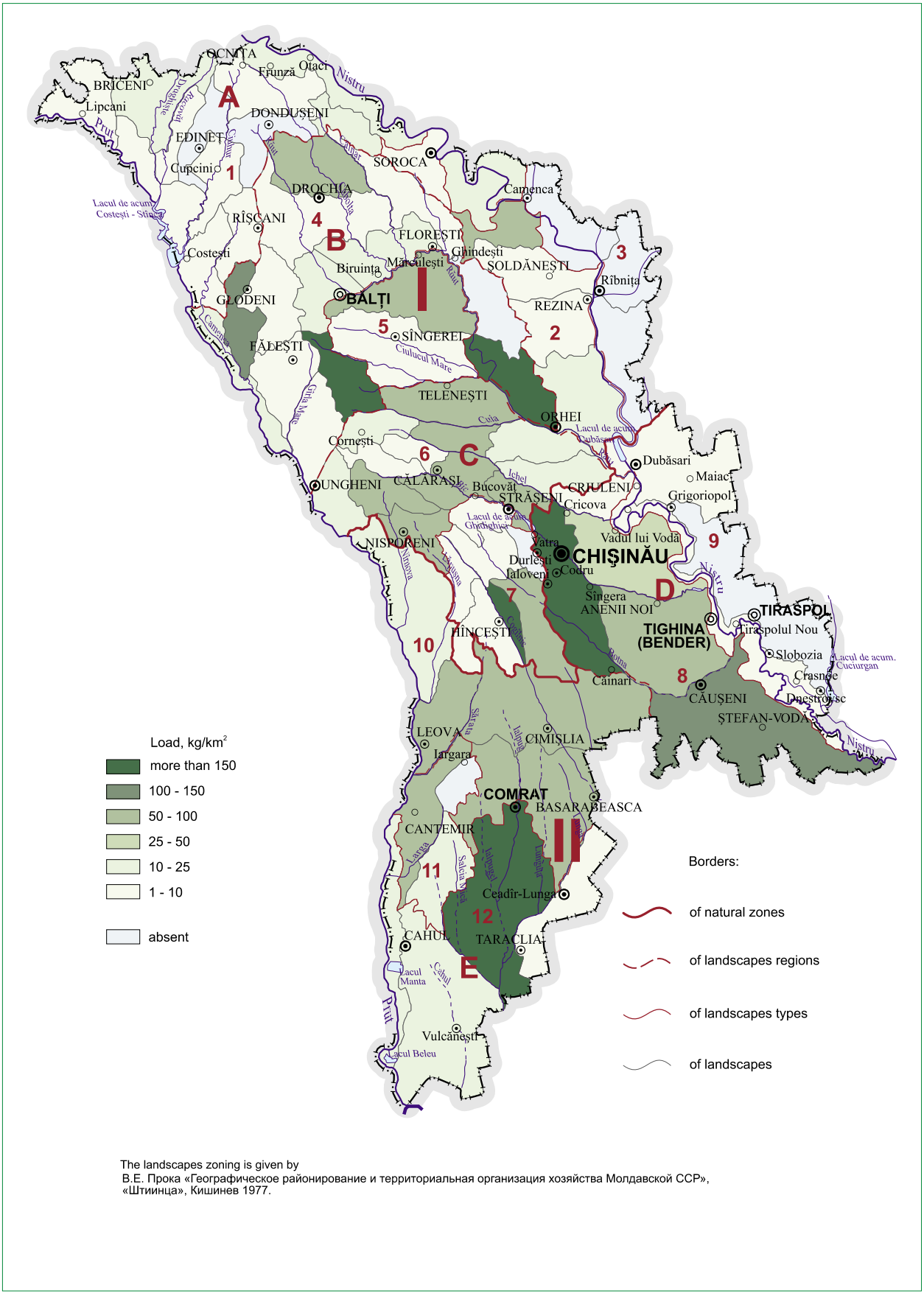


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Figure 5. LOAD OF PERSISTENT ORGANIC POLLUTANTS ON LANDSCAPES

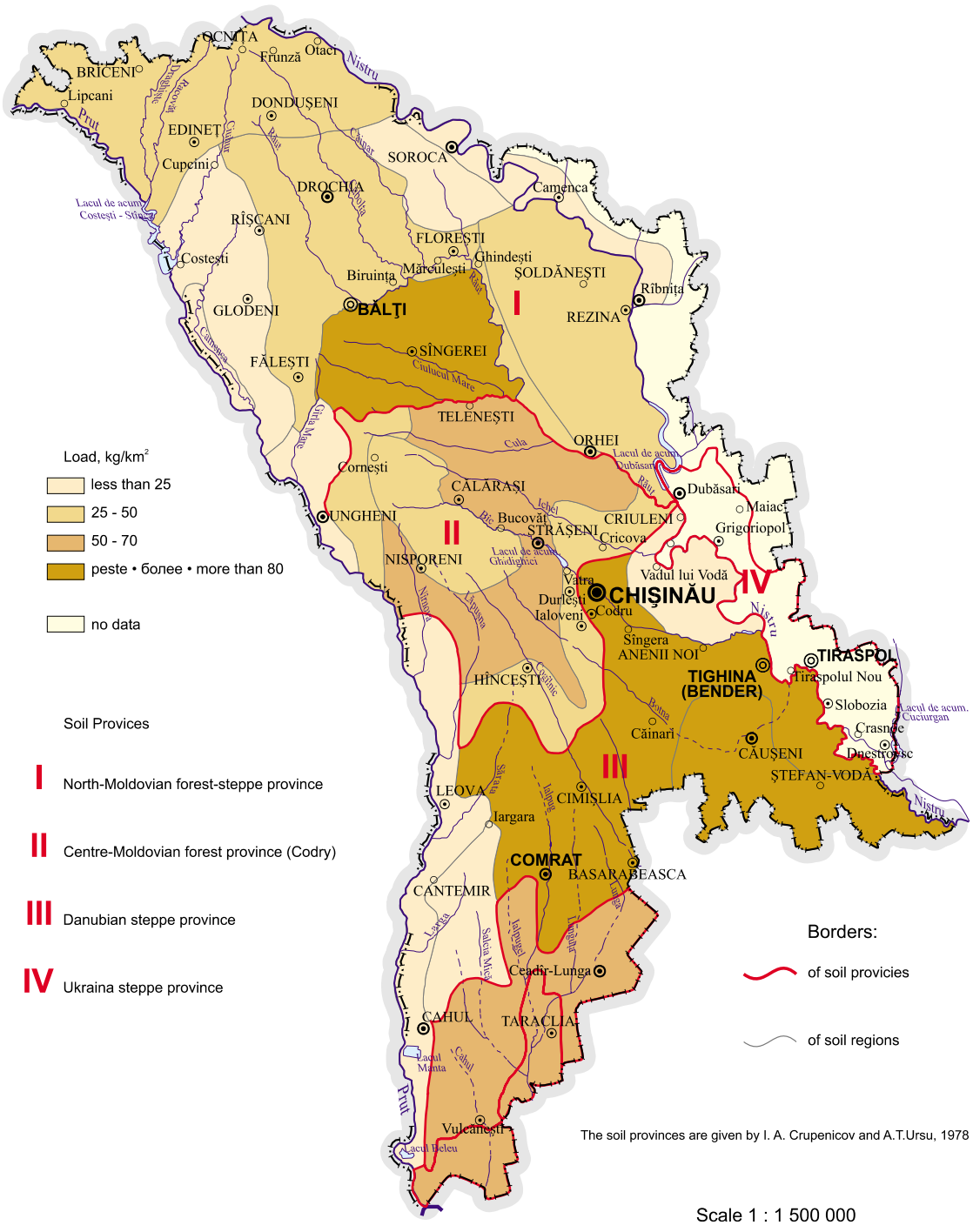

Figure 6. LOAD OF PERSISTENT ORGANIC POLLUTANTS ON SOIL REGIONS

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